ARCHIVES OF OPHTHALMOLOGY.

TUBERCULOSIS OF THE IRIS.

By Dr. H. RÜTER, of Berlin.

(*With two wood-cuts.*)

Translated by Dr. Porter Farley, of Rochester, N. Y.

ON June 10, 1880, Martin Seppelt, æt. 2 years, appeared at Prof. Hirschberg's clinic.

History: Parents healthy. Of his five brothers and sisters, four were scrofulous. The patient himself had already twice been at the point of death. The second time was four weeks ago, and his sufferings were caused by cramps which lasted the entire day. At that time the mother had noticed a gray spot upon the left eye, "in the pupil," as she said. During the last eight days this spot had grown perceptibly.

The child is cheerful, although evidently in pain from the affection of the left eye. He has marked hydrocephalus. The right eye appears healthy and possesses normal vision. In the left eye there is a high degree of pericorneal injection. The lateral half of the anterior chamber is filled with a cheesy mass, which is in contact with the posterior surface of the cornea. The cornea is transparent, but shows a newly developed blood-vessel. In the medial half of the iris gray miliary nodules are here and there visible to the naked eye. The pupil is closed by a thin exudation. Above, in the sclera, near the corneal margin, is a prominent yellowish-white nodule.

The diagnosis of tuberculosis iridis was made and enucleation determined upon; but at the entreaty of the mother the evacuation of the cheesy mass was first attempted June 11th. The patient was anæsthetized, and then a long lance-cut was made at

the corneal margin. A piece of the iris was drawn out and excised, but it was found impossible to evacuate the cheesy mass because, as from the first suspected, it was attached to the scleral nodule.

At first the wound healed well, but the cheesy mass still filled the anterior chamber as before, its bulk perhaps somewhat increased. Soon a mass of granulating tissue grew out of the wound. Accordingly on the 6th of July the enucleation which had been at first advised was undertaken. The wound healed in the usual manner.

On the 9th of September Prof. Hirschberg again had occasion to examine the child, and then learned that at least eight days previously he had suffered from epileptic spasms, which had continued from 5 to 9 o'clock in the evening. During the spasms he did not cry out as when first attacked. Three days after, he had become quite bright again, but retained the hemiplegia sinistra which had developed during the spasms. Examination showed that the child had no strength of grasp with the left hand; that it could not raise its left leg, while the functions of the right extremities were normal. The fundus of the right eye appeared to be normal, so far as the restlessness of the child permitted it to be seen.

The enucleated eyeball was preserved in Müller's fluid. For its examination a horizontal section was made.

Macroscopically examined, the following points were noted. The polar diameter of the eyeball measured 23 *mm.*, the equatorial diameter measured 21 *mm.* The shape was normal. Around the cornea the conjunctiva appeared changed. It formed a wall which presented a steep face on both its corneal and equatorial sides. The greater part of the anterior surface of the cornea appeared smooth; only on the lateral margin losses of tissue were noticed. Two of these spots were on the upper half of the eyeball, one of them close to the plane of section, the other a few millimetres from it. The last-mentioned defect is circular, and its periphery is marked by a fine white line. The whole cavity is filled with a yellowish-gray mass, which rises somewhat above the general surface of the eyeball. The larger defect, below the one, contains the same grayish substance with some projecting nodules.

Turning now to the cut surface as represented in fig. 1, it is first to be noticed that this represents the upper half of the eyeball.

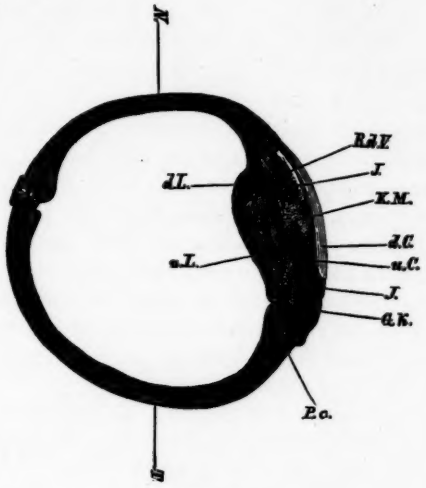


FIG. 1.

N. nasal, *T.* temporal side. *R.d.V.* rest of anterior chamber. *J.* iris. *K.M.* cheesy substance. *d.C.* transparent, *u.C.* opaque cornea. *G.K.* granulation nodule. *P. c.* processus ciliaris. *d.L.* transparent, *u.L.* opaque part of lens.

On the median side the cornea is normally continuous with the sclera, but on the temporal side it does not reach it. The intervening space, 3.3 *mm.* in width, contained the same grayish substance above described, which by this method of examination appeared to be a mushroom-like growth springing from the interior of the ball and spreading upon the neighboring sclera and cornea. Upon more minute examination still more of this substance is seen upon the cornea. Beginning at the median side the first fifth part of the cornea is normal. From this part toward the temporal side two layers can be distinctly recognized, an anterior transparent one which extends in uniform breadth from the nasal to the temporal side; and a posterior opaque one which appears like a deposit upon the cornea, and which increases in thickness as it approaches

the above-described opening, so that it finally covers the entire end surface of the cornea.

Only on the nasal side is there a slit-like trace of the anterior chamber, less than 1 *mm.* in breadth and 4 or 5 *mm.* in length. Elsewhere the space corresponding to the anterior chamber is filled, for the greater part, with a yellow, friable cheesy mass. A gray and more transparent portion extends over and into this cheesy mass, starting from the above-described granulation nodule. These cheesy masses are inseparably connected with the posterior surface of the cornea, and corresponding with this connection the lowest parts of the cornea are more opaque and gradually merge into the character of the granulation nodules.

The substance described as occupying the place of the anterior chamber rests immediately upon a stratum which, by its position and dark pigmentation, is recognized as the iris. The naked eye can perceive irregular processes of the black pigment extending into the region of the anterior chamber. The tissue of this pigmented layer appears remarkably soft, and increases in thickness noticeably toward the temporal side.

The ciliary muscle and processes present nothing remarkable.

The lens has a length of 8 *mm.*, and is greatly deformed Its entire temporal half is flattened from behind forward. It appears to consist of two kinds of substance, of which that on the nasal side possesses normal transparency, while the compressed part on the temporal side is opaque and gray. The relatively normal part of the lens surrounds the opaque part like a cap, and there is a sharp line of demarcation between the two.

The choroid and retina present nothing remarkable.

As to the method of microscopic examination, it is to be remarked that the sections were first examined in glycerine. Preparations were then stained with hæmatoxyline, and then double-stained with hæmatoxyline and eosine. These last showed the tubercular structure particularly well, the tubercles taking a deep red and showing plainly under a low power in the surrounding blue-colored tissue.

The sclera under microscopic examination appeared normal. The wall-like tumor surrounding the cornea proved to belong to the conjunctiva bulbi, and to consist of an accumulation of round cells in its loose tissue. The epithelium covered this part and extended upon the cornea in a normal manner until near its lateral extremity, where round cells begin to penetrate between the epithelial cells, and further on become so numerous as to cover the latter.

Bowman's membrane, reckoning from the nasal side, is at first smooth and plainly to be recognized under the epithelium. Near the middle of the cornea it begins to shrivel into folds, but without showing any thickening. Under

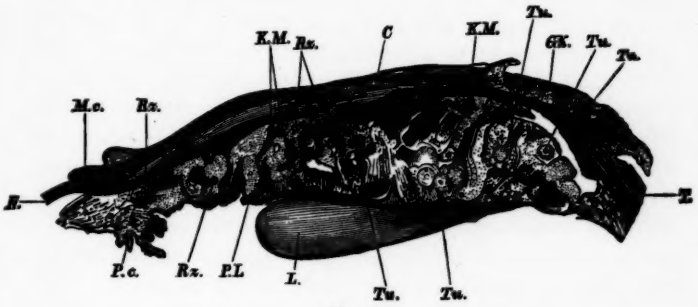


FIG. 2.

G.K. granulation nodule. *N.* nasal, *T.* temporal side. *M.c.* musc. ciliaris. *C.* cornea. *K.M.* cheesy masses. *Tu.* tubercle. *Rz.* giant cell. *P.c.* proc. ciliar. *P.L.* pigment layer of iris.

each fold was an accumulation of round cells. In the lateral third this layer is no longer visible, although the epithelium can still be plainly recognized.

As to the cornea, the layers immediately beneath Bowman's membrane are much infiltrated with round cells, as before described, at first in clusters which raise the epithelium into folds. Toward the periphery these cells coalesce, forming a uniform layer. The middle layers of the cornea are the least altered, while the posterior ones show considerable infiltration, especially in the neighborhood of the numerous newly formed blood-vessels.

The membrane of Descemet, at the place where a trace

of the anterior chamber remains, shows no special changes. At the part where the cornea adheres to the substance which fills the anterior chamber, traces of the membrane of Descemet can be here and there recognized. For the most part, however, there is nothing to be seen of it, and the above-described infiltrated layers of the cornea pass directly into the tissue which fills the anterior chamber.

This mass in the anterior chamber is attached to the iris, of whose changed and swollen tissue it is princpally composed. The iris is swollen to a thickness of from 2 to 2.5 *mm.* Its posterior pigmented layer is for the most part retained, and thereby the posterior boundary of the iris is sharply defined. Its anterior boundary extends forward on the one side to the above-named split-like trace of the anterior chamber; on the other side, to remnants of the membrane of Descemet, while in several places it passes directly into the infiltrated layers of the cornea. The substance of the iris consists essentially of tissue, very rich in cells, in which are embedded irregularly formed shreds of homogeneous, coarsely granulated substance. These shreds, as shown by all tests, consist of cheesy material. In the cell infiltration we recognize at first glance a great number of exceedingly characteristic spherical nodules, having a diameter of about 0.4 *mm.*; these consist of closely crowded nuclei and of great poly-nucleated giant cells, which lie in the middle of the nodules and present an irregularly spherical form. From most of these giant cells extend a number of processes which appear to pass into a net-work which envelops the entire nodule. In its meshes, next to the giant cells, lie large round cells, rich in protoplasm and having a large and distinct nucleus; nearer the surface there is a deposit of round lymphoid cells; and, finally, the entire ball is surrounded by pigment cells from the pigmented boundary layer of the iris. In short, we have here the histological tubercle as first described by E. Wagner ("Das tuberkelähnliche Lymphadenom," *Arch. f. Heilkunde*, 1870–71), and properly recognized by E. Schüppel ("Lymphdrüsentuberculose," 1871). These tubercles are destitute of vessels and are scattered quite regularly throughout the entire iris,

anterior to its vascular layer. The shreds and flakes of cheesy substance are deposited for the most part upon the numerous tubercles, and by far the greatest part of the iris consists of these tubercles and cheesy masses. Between them is a slight quantity of small-cell tissue, with embedded pigment cells—ordinary granulation tissue—well supplied with vessels. As already mentioned, the tubercle is very well shown by staining with eosine.

At several places between the cornea and the thickened tubercular iris is a small quantity of finely granulated substance—coagulated exudation.

In the uveal tract there is a change in the ciliary muscle which should be mentioned, though unimportant as compared with the condition of the iris; namely, a decided cellular infiltration, a sign of its participation in the disease.

The condition of the lens is to be noticed. Its capsule, which in other places is intact, is attached by nearly its entire anterior surface to the posterior wall of the iris. The clouding of the lower part of the lens is not caused by round-cell infiltration.

Surveying all these appearances we have here undoubtedly a tuberculosis iridis which, beginning in the miliary form, gradually developed into a tubercular infiltration of the whole iris, and also involved the corneal wound which had been made for its attempted cure. Thereupon there occurred cyclitis with anterior and posterior adhesions to the iris and partial clouding of the lens. In the other parts of the eye no pathological changes were seen.

Until recently opthalmologists have differed greatly on the subject of tubercle. Although some of the older authorities recognize the occurrence of tubercle in the eye, the majority of ophthalmologists regarded the eye as exempt from this disease, until in 1858 the well-known case reported by Manz dispelled this illusion. Cohnheim and Busch quickly followed with descriptions of similar appearances found in the cadaver, and in 1868 Gräfe and Leber for the first time saw tubercle in the living eye. It is reported that E. Von Jäger on Jan. 10, 1855, recognized

tubercle ophthalmoscopically in the living eye, and that his diagnosis was verified *post-mortem;* also that he found tubercle in the eyes of four cadavers in cases not recognized during life. After the observations by Gräfe and Leber, reports of similar observations began to multiply, as appears by reference to the literature of the subject. But in all these cases the ophthalmoscopic appearances were of no importance to the ophthalmologist. Miliary tubercle of the choroid was a convenient auxiliary point in diagnosis, a recognition of which was of important service to other practitioners. In all these cases the affection of the eye was only an unimportant symptom of a general disease.

The labors of Schüppel, Köster, and Friedländer first proved that true tubercle sometimes occurs in a limited portion of the body without invasion of the entire organism, as in the granulations of fungoid inflammation of the joints, in scrofulous hypertrophied lymph-glands, in scrofulous abscesses of the skin, ulcers, caries, lupus, etc.; in short, that in nearly all so-called "scrofulously diseased" organs these malignant growths may occur. After this time diseased eyes began to be observed with reference to the presence in them of miliary tubercle, and soon cases of local tuberculosis became known.

Allow me here to describe several of these cases with which the one we are particularly considering possesses a common likeness.

The oldest of the cases is that reported by Gradenigo in 1869 (see literature). Perls quotes him, *Annal. d' oculistique*, 1870, vol. lxiv, p. 175 (*Archiv. f. Ophth.*, Bd. xix, 1, p. 122). This was the case of a man 21 years old who had on the right side slight conjunctival œdema with intense pericorneal injection, and round gray spots of pin-head size in the cornea, partly in its posterior layer and projecting into the anterior chamber. The iris presented slight diffuse discoloration, with six or seven round submiliary nodules, contracted pupil, and posterior adhesions. Hemorrhages occurred several times in the eyeball, and after some time similar nodules could be seen in the iris of the other eye, but unaccompanied by inflammatory symptoms. After

three months the opportunity for an autopsy occurred, which revealed general miliary tuberculosis with both old and recent tubercles. The nodules in the eye, according to Gradenigo's somewhat ambiguous description, possessed the characteristics of tuberculous formations, and there can be no doubt that this was a case of miliary tubercle of the iris.

The second case is that observed by Perls (*Archiv. f. Ophth.*, Bd. xix, 1, p. 221). Alfred K. was born of a healthy mother April 6, 1872. In 1865 the father had contracted syphilis and had undergone radical treatment. Later, in 1871, an infiltration appeared in the apex of his right lung, followed by formation of a cavity. Nevertheless, under suitable treatment he experienced continued improvement. The little boy during the first half year of his life suffered frequently from catarrh, which disappeared readily. It was often observed that the signs of congenital syphilis were absent. The child was strong and well nourished. On the 15th of Oct., 1872, Perls saw the boy suffering from an acute kerato-iritis. In the iris of the left eye was a slightly elevated, circumscript nodule which he regarded as a gummy tumor. On consultation with Prof. Julius Jacobson it was determined to resort to the local use of atropine and the internal use of mercurials. In spite of all mercurials the condition of the eye grew worse, but the general condition of the child remained good. Gradually, however, the apex of the right lung became infiltrated, and the child became reduced by cough, loss of appetite, and slight fever. On Nov. 18th convulsions occurred, and they returned with short pauses. Death occurred Nov. 21st. The condition here found was that of disseminated miliary tuberculosis. "It is certain that in the examination of this case we have recognized a tuberculous cyclitis which, beginning in circumscript nodules, progressed to suppuration, to corneal ulcer, and to tubercular infiltration of the entire iris and of a part of the ciliary body. It is well to mention that although such an affection of the iris is not frequent, still, when the attention has once been directed to its existence, more of such cases come to notice. As points in the differential diagnosis between iritis gummosa and tubercle in cases

such as this, where distinct nodules are not to be seen, may be mentioned the paucity of vessels in the infiltration, and the existence of the tubercular diathesis, and, particularly in children, the presence of cheesy degeneration of the lymph-glands."

Two years passed away before the publication of the third case. In 1875 Giulio Saltini published (*Annali d' ottalm.*, vol. iv, pp., 127–131), under the title "Un caso di neoplasia dell' iride," the following description of a case, the pathological anatomy of which was afterward accurately described by Manfredi. A girl, 16 years old, of a weak constitution, had complained for four weeks of slight dimness of vision and pain in her right eye. She had great congestion of the conjunctiva, and upon the inner part of the anterior surface of the iris was a round tumor as large as a moderate-sized pea, which extended outward to the margin of the pupil and inwardly was lost in the scleral boundary. Some blood-vessels could be seen upon its surface. The remainder of the iris was normal. Saltini mistook the condition at first for abscess, and attempted puncture. This, however, only caused the escape of some bloody serum without any collapse of the tumor. A week later its size had increased. It now covered three-fourths of the pupil, and greatly interfered with vision. Saltini then attempted to excise that part of the iris involved in the tumor, but again with no success, for during the next few weeks the tumor grew again and penetrated outward through the ciliary region, and enucleation of the eyeball was performed. Upon examination Manfredi found true tubercle of the iris. Subsequently he saw the patient again. She was strong and healthy, had no cough nor any symptoms of tuberculosis of the other organs. The wound of the operation was entirely healed.

In 1877 there appeared in *Arch. f. Ophth.*, Bd. xxiii, 4, p. 57, an exhaustive treatise by Weiss upon "Tubercle of the Eye." After relating three cases the author enters upon a discussion of the general subject of tuberculosis. His third case is of special significance to us. It is in brief as follows. On the 15th of April, 1876, Carl Seitz, a laborer,

51 years of age, was received in the Heidelberg Eye Clinic. In his right eye was lenticular cataract with considerable capsular cataract. Projection and perception of light were good. The patient had recently recovered from pneumonia; during this sickness he saw well, and only during the last fortnight had he noticed that his sight was poor in his left eye. The eye watered and pained him. The patient bound raw flesh upon it, and under this treatment there had developed numerous small corneal ulcers, mostly in the periphery. But aside from the ulcerated spots, the general surface of the cornea was not smooth. It appeared stippled. The iris was discolored. After the repeated use of atropine the contracted pupil was not widely dilated. The iritis might have been consecutive to the improper treatment of the keratitis. The great cloudiness of the vitreous, however, suggested some deep-seated disease of the eye. Under proper treatment the corneal ulcers cleared up, but the pupil remained contracted.

On the 27th of April a yellowish nodule could be seen upon the upper-outward portion of the iris. Upon the possibility of syphilitic disease being present, treatment by inunction was begun. Under this treatment, however, more similar nodules appeared, and the diagnosis of syphilis was abandoned. Tuberculosis of the eye was now suspected, but this diagnosis was rejected because no signs of phthisis could be detected in the chest.

The diagnosis of "granuloma of the iris" was fixed upon.

Meanwhile new nodules continually appeared, accompanied by great ciliary congestion. Vision failed more and more. Severe pains soon occurred, which, on the 21st of June, necessitated the removal of the eyeball. Upon examination, well-characterized tubercles were found in all parts of the eye. "In the case last described we find histological tubercle in nearly every part of the eye. In no other part of the body could any tuberculous affection be detected. This must have been a case of primary tuberculosis of the eye, perhaps confined to that special locality."

Five months later there developed upon the upper jaw, at the site of the enucleated eye, a tumor, which after its re-

moval proved to be an enlarged lymph-gland containing cheesy matter and tubercles.

Each of the foregoing cases speaks for itself. The four clinical histories contain the entire pathology and therapeutics of tuberculosis of the eye, when it occurs as a local affection. In the first two cases the tubercular disease appears to have had its primary seat in the eyeball. They accordingly point out the way to a diagnosis, and show the course of the disease. The last two show the method and consequences of treatment.

The discussion of a similar case by the Société de Chirurgie on July 9, 1879, is exceedingly interesting in this connection. On account of its great importance I here quote it from the *Centralbl. f. pr. Augenh.*, for July, 1879.

Dr. Anger related an observation made by Dr. Parinaud. The case was one of a 12-year-old child of phthisical parents, who had suffered from a discharge from the left ear. For five months past he had complained of increasing dimness of sight without his eye being at all painful (which eye was affected does not appear). Upon examination many changes were found. There was a whitish infiltration in the under part and in the posterior layers of the cornea. There was pus in the anterior chamber, but the iris could still be examined. Several tumors could be seen upon its anterior surface: one near the ciliary margin, the others near the pupil. They were four or five times as large as a pin head, were of a yellowish color, and projected into the anterior chamber. One of them has numerous small vessels on its surface, and from this one project small processes. Under these circumstances there could be no thought of syphilitic condyloma. Dr. Parinaud believed himself justified in the diagnosis of tubercular iritis. The eyeball was not very hard, but was red and probably diseased in its deeper parts. There was only slight perception of light. Dr. Parinaud sought in vain for tubercles in the fundus.

The general condition of the child was good. Dr. Parinaud asked the Society, first: whether this was a case of primary tubercle of the iris? and second, what was the proper treatment? Dr. Auger answered that it was un-

doubtedly a case of tubercle of the iris, five cases of which had been already published, and that the eyeball should be enucleated. He believed with Laennec and Virchow that it was possible for local tubercle to become general. If tubercle developed in an accessible position it should be removed. He had treated a patient with tubercle of the eye; the enucleation was not made, and the patient died after a few months.

Dr. Verneuil said: "I dissent from the views of Dr. Anger. I well know that on Virchow's authority the German surgeons wage a bitter war against tubercle. Cannot tubercle heal by calcification? Is it not seen that operations often cause death by hastening generalization? I beg the Society not to accept the positive conclusion of Dr. Anger."

Dr. Deprès said: "I have held that tubercle is at first a local disease, but that it develops into fatal pulmonary tuberculosis. But I by no means compare tubercle to a malignant tumor. Tuberculosis is a general disease extending more or less into the circulation. The surgeon who removes a tubercular deposit is in much the same position as if in a case of established purulent infection he were to operate at the point of primary infection."

Dr. Trélat said cancer may spread by continuity of tissue or by transportation—metastasis. The original deposit is the source of all the evil. If this is removed it is possible to check, if not to heal, the disease. But an individual who has tubercle anywhere is tuberculous. The tubercular diathesis is a general condition, the predominating factor in his organization. I would permit the removal of tubercular deposits only for the relief of local symptoms. After the operation the patient remains tuberculous as before.

Dr. Giraud-Teulon declined to enter upon the discussion of the general subject. He is, however, inclined to regard tubercle as similar to malignant tumors, and he advises enucleation.

Dr. Fort agrees with the views of Dr. Trélat: "Cancer is originally local."

Dr. Tillaux was of the opinion that the case in question

was one of tubercle of the iris, and that enucleation was necessary, but only in order to avoid sympathetic disease.

Dr. Marc Sée admitted that tubercle is a constitutional disease, but he cited, in support of the German theory, the fact that when sputa from a phthisical patient are injected into a dog's joint, fungoid arthritis ensues, followed by death from general tuberculosis.

The last case which I find recorded is that of Dr. Samelsohn, reported at the session of the Niederheinische Gesellschaft für Natur- und Heilkunde in Bonn, December, 1878. In point of time this case was reported before the one which I have just referred to, but for two reasons I have left it to the last. First, it clearly shows how by careful observation of the course of the disease in the eye alone, without perceptible tubercular disease in any other organ, a diagnosis may be made with reasonable certainty; and second, because this is the first case in which the diagnosis of "tuberculosis oculi" was confirmed by inoculation of a rabbit, which, according to Cohnheim, is the only reliable proof of tubercular disease.

Dr. Samelsohn presented a girl, 17 years old, with a tumor in the anterior chamber of the right eye, which he explained to be a tubercle of the iris. He did not enter upon an exhaustive anatomical demonstration, but discussed only the clinical differential diagnosis of the case. Four weeks ago, without any marked inflammatory symptoms, there appeared in the anterior chamber of the right eye, upon the temporal side, a yellow nodule, which by its growth into the pupil reduced vision to only quantitative perception of light. But as the nodule also perforated the eyeball outward, the patient came to Samelsohn, who observed as follows. The right cornea was diffusely crowded especially on the temporal side, and there was some superficial vascularization; its surface was raised by a growth which had broken through from the anterior chamber at the corneo-scleral boundary and had pushed the conjunctiva before it. This growth was of a yellowish-white color, and presented in the anterior chamber the form of a triangle, whose apex reached the middle of the pupil in the horizontal meridian, and

whose base corresponded with about one third of the corneo-scleral margin on the temporal side. Two distinct layers could be distinguished in the growth, a white layer immediately upon the iris, and a mottled yellow one forming the superficial portion of the tumor. The tumor itself had no vessels except at the base, where they started from the iris and were lost after running a little way upon the surface of the growth. In that part which, by the presence of newly formed blood-vessels, was evidently iris tissue, there now appeared a little yellow-white nodule, which on the next day united with the principal mass. Shortly after new vessels sprouted from the iris, and again accompanied the development of a new nodule. This rôle was repeated four times in the course of a week, and Samelsohn demonstrated one of these newly developed nodules. While by the coalescence of these discrete nodules the tumor grew in a downward direction, the old mass was at the same time driven further forward, and at last broke through the conjunctiva. The iris was slightly discolored and was adherent to the lens in several places. The eyeball was soft. There was quantitative perception of light, with good projection. Small pieces of that part of the growth which projected from the eyeball showed upon microscopic examination small round cells and granular detritus. In this case the diagnosis could lie only between granuloma and tuberculosis of the iris, since for many reasons, but particularly by reason of locality and the manner of growth, gummy tumor was excluded. Notwithstanding the fact that the microscopic examination failed to reveal the presence of any of the elements characteristic of tubercle, especially of giant cells, the diagnosis of tubercle of the iris was made, based upon the progressive, nodulated nature of the growth, upon the distinction in color between its old and new portions, upon its rapid and painless development, and, especially, upon the presence of other tubercular symptoms in the patient. Upon the right side of the back and upon the skin of the right clavicular region were two ulcers, having all the signs of being tubercular in character. Prolonged expiration and catarrh were detected in the apex of

was one of tubercle of the iris, and that enucleation was necessary, but only in order to avoid sympathetic disease.

Dr. Marc Sée admitted that tubercle is a constitutional disease, but he cited, in support of the German theory, the fact that when sputa from a phthisical patient are injected into a dog's joint, fungoid arthritis ensues, followed by death from general tuberculosis.

The last case which I find recorded is that of Dr. Samelsohn, reported at the session of the Niederheinische Gesellschaft für Natur- und Heilkunde in Bonn, December, 1878. In point of time this case was reported before the one which I have just referred to, but for two reasons I have left it to the last. First, it clearly shows how by careful observation of the course of the disease in the eye alone, without perceptible tubercular disease in any other organ, a diagnosis may be made with reasonable certainty; and second, because this is the first case in which the diagnosis of "tuberculosis oculi" was confirmed by inoculation of a rabbit, which, according to Cohnheim, is the only reliable proof of tubercular disease.

Dr. Samelsohn presented a girl, 17 years old, with a tumor in the anterior chamber of the right eye, which he explained to be a tubercle of the iris. He did not enter upon an exhaustive anatomical demonstration, but discussed only the clinical differential diagnosis of the case. Four weeks ago, without any marked inflammatory symptoms, there appeared in the anterior chamber of the right eye, upon the temporal side, a yellow nodule, which by its growth into the pupil reduced vision to only quantitative perception of light. But as the nodule also perforated the eyeball outward, the patient came to Samelsohn, who observed as follows. The right cornea was diffusely crowded especially on the temporal side, and there was some superficial vascularization; its surface was raised by a growth which had broken through from the anterior chamber at the corneo-scleral boundary and had pushed the conjunctiva before it. This growth was of a yellowish-white color, and presented in the anterior chamber the form of a triangle, whose apex reached the middle of the pupil in the horizontal meridian, and

whose base corresponded with about one third of the corneo-scleral margin on the temporal side. Two distinct layers could be distinguished in the growth, a white layer immediately upon the iris, and a mottled yellow one forming the superficial portion of the tumor. The tumor itself had no vessels except at the base, where they started from the iris and were lost after running a little way upon the surface of the growth. In that part which, by the presence of newly formed blood-vessels, was evidently iris tissue, there now appeared a little yellow-white nodule, which on the next day united with the principal mass. Shortly after new vessels sprouted from the iris, and again accompanied the development of a new nodule. This rôle was repeated four times in the course of a week, and Samelsohn demonstrated one of these newly developed nodules. While by the coalescence of these discrete nodules the tumor grew in a downward direction, the old mass was at the same time driven further forward, and at last broke through the conjunctiva. The iris was slightly discolored and was adherent to the lens in several places. The eyeball was soft. There was quantitative perception of light, with good projection. Small pieces of that part of the growth which projected from the eyeball showed upon microscopic examination small round cells and granular detritus. In this case the diagnosis could lie only between granuloma and tuberculosis of the iris, since for many reasons, but particularly by reason of locality and the manner of growth, gummy tumor was excluded. Notwithstanding the fact that the microscopic examination failed to reveal the presence of any of the elements characteristic of tubercle, especially of giant cells, the diagnosis of tubercle of the iris was made, based upon the progressive, nodulated nature of the growth, upon the distinction in color between its old and new portions, upon its rapid and painless development, and, especially, upon the presence of other tubercular symptoms in the patient. Upon the right side of the back and upon the skin of the right clavicular region were two ulcers, having all the signs of being tubercular in character. Prolonged expiration and catarrh were detected in the apex of

the right lung. Dulness on percussion was still absent. Samelsohn expected that medical treatment would prove useless, and intended to remove the eyeball; after which he promised to report further.

In the February number of the *Centralbl. f. pr. Augenh.*, 1880, is the continuation of this interesting case. At the session of the Ophthalmological Society in Heidelberg, Aug. 11 and 12, 1879, Dr. Samelsohn stated that the tumor continued steadily to grow by apposition, until finally it penetrated upward through the conjunctiva, and the eye was removed.

Before this operation little particles of the tumor, which were removed from the anterior chamber, were put into the eye of rabbit. They were completely absorbed, but tubercle of the iris did not follow.

Immediately after enucleation the eye was opened, and part of the granulation mass was placed in the eye of a rabbit. This experiment resulted in nothing. But upon a second and third trial, the inoculation was followed by positive results. In both these cases tubercles appeared upon the iris, and in one of them they soon spread throughout all the organs of the body with the exception of the lungs.

Samelsohn believed that this experiment had absolutely confirmed his diagnosis, although his microscopic examination of the cheesy mass had been fruitless.

The subject of tuberculosis of the eye is so directly dependent upon the subject of tuberculosis in general that it is necessary here to make a brief excursion into the region of general pathology. Samelsohn's case suggests the question: "What is the character of tubercle?" The founder of the present prevailing views concerning tubercle is Virchow. He asserts first that the essential feature of this disease consists in the presence of tubercles—those gray submiliary nodules which Laënnec had called attention to,—and not, as the latter had taught, in the cheesy substance occurring in connection with them. Furthermore, Virchow gave a definition of what he was willing to regard as tubercle, a definition which is accepted by all recent investigators of this subject. Virchow placed the tuberculous growths in

the class of "lymphatic granulation tumors" (Virchow, Die krankhaften Geschwülste," Bd. ii, p. 385 etc., 555 etc., Berlin, 1865). His definition was: "Tubercle is a small spherical growth always proceeding from connective tissue and consisting of small round cells closely crowded together. The life of this neoplasm is a limited one. A degeneration of its elements very soon begins, and always first in the middle of the spherule. In most cases the result is a cheesy deposit. Aside from this local character the neoplasm possesses another, which necessitates its classification among the malignant tumors, namely, a decided tendency to spread throughout the entire organism."

This definition has been developed in two different ways, microscopically and experimentally.

In the first place, Langhans found giant cells almost constantly present in tubercle. Virchow had occasionally observed their presence, but to Langhans belongs the credit of having recognized their presence as typical. Moreover, he pointed out the peculiar nature of the giant cells of tubercle as distinguished from those found elsewhere. Köster recognized the epitheloid character of the cells surrounding the multinuclear element, their richness in protoplasm, the large oval nucleus with its bright nucleolus. This proof of a definite organization of these neoplasms gave great precision to the above definition. The consequence was that tubercle began to be looked for in hitherto unsuspected localities. Köster found miliary tubercles in the granulations of fungoid arthritis (*Virchow's Archiv*, Bd. xlviii, p. 95); Schüppel, in the cheesy degenerated glands of scrofulous subjects ("Untersuchungen über Lymphdrüsentuberculose," 1871); Friedländer, in scrofulous abscesses and ulcers of the skin, and in caries, lupus, etc. ("Ueber locale Tuberculose," *Volkmann's Sammlung klinischer Vorträge*, No. 64). In short, the doctrine of local tuberculosis was established.

At about the same time that Virchow promulgated his views on miliary tuberculosis, Villemin published an important observation ("Études sur la tuberculose," Paris, 1868). He had discovered that tubercle could be communicated to

the lower animals, and especially to rabbits, by inoculation. By these experiments the significance of Virchow's definition was experimentally extended. Cohnheim was the principal investigator of this subject. Before I state his views, allow me to describe some experiments which are of great significance to ophthalmologists, and which are directly connected with our present subject.

On the 13th of July, 1877, at the session of the medical section of the Schlesische Gesellschaft für vaterländische Cultur, Prof. Cohnheim related some experiments which he, in conjunction with Dr. Salmonsen, of Copenhagen, had made in the artificial production of tuberculosis. Tubercular material was introduced into the anterior chamber of rabbits' eyes. There followed only a slight kerato-iritis, provided the material, when introduced, was not putrid. In a few days the eyes became clear and remained so for several weeks, and the general condition of the animal was unaffected. The particles which had been introduced grew constantly smaller, so that often only a trace of them remained. Suddenly there appears, one day, in the tissue of the iris one, or perhaps several bright gray nodules, scarcely visible to the naked eye, but very plainly seen through a lens. In the course of the next day they increase in size, become white in the centre, and project very evidently above the iris. Their number increases every day, so as in some cases to equal thirty or forty nodules in a single eye. The substance of the iris itself swells considerably and becomes very red. The eyes remain in this condition for a while; then hypopyon appears; there is developed a vascular keratitis, with successive keratomalacia, keratoconus, and keratoglobus, until after the course of about four weeks from the first eruption of the nodules the cornea becomes covered with a thick, opaque pannus.

Such is the usual course; but it sometimes happens that a severe iritis is the first symptom, and only some days later the tubercles can be for the first time detected in the inflamed iris tissue.

The most frequent time for the appearance of the above-described symptoms was the beginning of the fourth week

after inoculation. Gray and cheesy deposits from human subjects, chronic and acute miliary tubercles, cheesy particles from extirpated human scrofulous glands, material from tubercle artificially produced in guinea-pigs and rabbits, all proved effective; on the contrary, the cheesy degeneration of cancer, a piece of the still non-tuberculous muscle of a tubercular guinea-pig, simple lymphoma, and local arthritic tubercle, so far as yet observed, are ineffective.

The conclusions concerning tubercle which Cohnheim deduces from his numerous experiments are published in two of his works, viz.: "Vorlerungen über allgem. Pathol.," Bd. 1, page 607, 1877, and in an address dated Sept. 23, 1879, entitled "Die Tuberculose vom Standpunkt der Infectionslehre."

In the first-named work Cohnheim classifies tubercle in the same category with syphilis, glanders, lupus, leprosy, and, in accordance with Klebs (*Prag. Vierteljahrsschrift*, vol. cxxiv), calls this group "infection tumors" He accepts the doctrine of Villemin and Klebs as to the specific nature of the virus of tubercle. "That tubercle is a disease of infection; that the general disease of the organism is of equal importance with the anatomical recognition of the tubercles themselves; that the most-marked symptom of a constitutional disturbance is the fever which almost constantly accompanies tuberculosis" (page 611). Judged by this criterion local tubercle is not real tubercle; the nodules in the granular tissue of fungoid arthritis are only tuberculoid.

After Cohnheim had become satisfied that the tubercle which remains limited to a few organs is true tubercle in spite of the fact that there is no fever, he two years later, in the address above referred to, announced a new definition by which he endeavored to supplant Virchow's anatomical definition by an etiological one. He says: Every thing is tubercle which, when inoculated into an animal, will produce tubercle; and nothing is tubercle which, when so inoculated, will not produce tubercle."

Thus Laennec regarded the cheesy degeneration as characteristic of tubercle; Virchow so regarded the miliary

nodules; Köster, Schüppel, Wagner, and Friedländer emphasized the peculiar organization of these nodules, while Cohnheim added their inoculability.[1]

In the foregoing discussion the anatomical standpoint has been adhered to. We have been satisfied to prove the existence of tubercles in the iris. Samelsohn has gone further, and by proving their inoculability, has demonstrated the existence of true tubercle of the eye.

In conclusion I wish to express my thanks to Prof. Hirschberg and to Dr. Friedländer for their kind assistance rendered in this work.

BIBLIOGRAPHY.

DEMOURS. Traité des maladies des yeux, 1812.

MACKENZIE. Traité pratique des mal. de l' œil, 1858.

JACOB. Treatise on the inflammation of the eyeball.

E. JAEGER. *Oesterr. Zeitschr. f. prakt. Heilk.*, erster Jahrg., No. 2.

STELLWAG. Lehrbuch.

QUAGLINO. Sulle malattie interne dell' occhio. Saggio di clinica et iconogr. ottalm. Milano, 1858.

ARCOLEO. Sulla tubercolosis oculare. Dissertaz., Palermo, 1862.

MANZ. *Archiv f. Ophth.*, Bd. iv, 2, 1858.

MANZ. *Archiv f. Ophth.*, Bd. ix, 3, 1863.

BUSCH. *Virchow's Archiv f. path. Anat. u. Phys.*, Bd. xxxiv, 1866.

COHNHEIM. *Virchow's Archiv f. path. Anat. u. Phys.*, Bd. xxxvi, 1867.

GRÄFE und LEBER. *Archiv f. Ophth.*, Bd. xiv, 1868.

B. FRÄNKEL. *Klin. Monatsbl. f. Augenheilk.*, 1869.

GRADENIGO, *Giornale ven. di scienz. med.*, Luglio, Agosto, 1869.

GALEZOWSKY. *Archiv. génér. de médec.*, September, 1867.

BOUCHUT. *Gaz. des hôp.*, No. i, 2, 1869.

PERLS. *Archiv f. Ophth.*, Bd. xix, 1, 1873.

MANFREDI. Contribuzione clin. ed an. pat. alla tub. oc., 1875.

SALTINI. *Annali d' ottalm.*, Bd. iv, pages 127–131, 1875.

PONCET. Choroid. tub. *Gaz. méd.*, 18 Fevr., 1875.

TROCHE. Des tub. de la choroide. *Thèse de Paris*, 1875.

DUBRISAY. *Gaz. des hôp.*, page 850, 1875.

BOUCHUT. *Gaz. des hôp.*, pages 338, 347, 1875.

---

[1] Since the publication of this paper in the January number, 1881, of the German edition of these ARCHIVES, the important investigations of Dr. R. Koch, demonstrating "the presence of *characteristic bacteria* in all tissues that are the seat of morbid alterations by tubercles," have caused a universal sensation. Dr. Hugo Engel gives an excellent exposition of the subject, "almost a literal translation of Dr. Koch's lecture *on the etiology of tubercle*, delivered before the Berlin Physiol. Society on March 4, 1882," in the *Phila. Med. Times*, September 9, 1882, p. 843, etc. K.

BOUCHUT. *Gaz. des hôp.*, pages 241, 563, 1876.

HIRSCHBERG. Ueber Choroid. tub. *Centralbl. f. Augenh.*, page 17, 1877.

WEISS. *Archiv f. Ophth.*, Bd. xxiii, 4, page 57, 1877.

SAMELSOHN. *Centralbl. f. prakt. Augenh.*, Juli, 1879.

SAMELSOHN. *Centralbl. f. prakt. Augenh.*, Febr., 1880.

ANGER. Primäre Tub. der Aderhaut. Soc. de Chirurg., Paris, 27 Nov., 1878.

HIRSCHBERG. Ueber Bindehauttuberculose. *Centralbl.*, page 203, note, 1879; und *Berl. klin. Wochenschr.*, Nov., 1879.

ANGER. *Centralbl. f. prakt. Augenh.*, Juli, 1879.

KÖSTER. *Centralbl. f. med. Wissensch.*, Jahrg. 1873, page 913.

WALB. *Klin. Monatsbl. f. Augenh.*, page 257, 1875.

HOCK. *Klin. Monatsbl. f. Augenh.*, page 309, 1875.

HERTER. *Charité-Annalen*, 1875, zweiter Jahrg., page 523.

WALB. *Klin. Monatsbl. f. Augenh.*, August, 1877.

SATTLER. Bericht über die Sitz. der Heidelb. ophth. Ges., 1877.

EYE-DISEASES FROM MASTURBATION.

By Prof. HERMANN COHN, of Breslau.

Translated by Dr. R. O. Born, of New York.

THE notes which are furnished by the ophthalmological literature about the influence of excessive masturbation upon the visual organ, are very scant. Especially on this subject the most careful observers have been particularly sceptical, in order not to confound the *post hoc* with the *propter hoc*. The difficulty of obtaining accurate statements from the patient; the aversion of even older physicians to make the pertinent inquiries in young girls; the experience that patients in whom the physician suspects a connection between their eye-disease and onanism, be it conceded by the patient or not, do not return for treatment;—all these circumstances have probably been the cause that nothing has been published in regard to this question, whilst the connection between eye-diseases and all kinds of general diseases and habits have of late been a favorite field of study for the oculists.

I am fully aware of the difficulties of explaining the causal connection between onanism and eye-disease, and have no intention to enter upon theoretical discussions and suppositions. I shall only relate a series of observations which conform in so many points, that it would be difficult to deny the connection, especially since in some cases, after the discontinuance of the masturbation the morbid symptoms disappeared.

I.—*Photopsia.*

In the literature to which I have access, I find no mention of this difficulty in connection with masturbation. In my private practice I have observed 15 cases, a few of which I shall shortly relate.

Case 1.—A moderately strong, pale young man, 24 years of age, has complained for some weeks from photopsiæ and a feeling of pressure upon the eyes. He can not endure reading longer than 20 minutes, and he has the sensation as if a brightly illuminated window was continually moving to and fro before his eyes. Emm. S=1. The eye otherwise normal. From the 13th to the 18th year he had been masturbating daily, sometimes three times. Pain in head and back; spermatorrhœa and asomnia followed. I advised moderate normal sexual intercourse and a smoked glass, which immediately reduced the symptoms. In the course of a few weeks he lost his photopsies, the pollutions, and the feeling of pressure upon the eye. Nine months later, whilst he was engaged to be married, he had a relapse, from sexual excitement.

Case 2.—Z., 31 years old, delicate, pale, had a very troublesome dazzling before his right eye, as if a bright figure was moving before this eye. S=1. H $\frac{1}{36}$ in the right, H $\frac{1}{24}$ in the left eye. He had been masturbating excessively from the 10th to the 18th year; then married, had three children, but continued to masturbate. The dazzling was very annoying some months later; nothing further known about the case.

Case 3.—Franz P., a very healthy-looking, strong farmer, 29 years of age, complained for two years of continual photopsies which appeared either as snow-flakes or as transparent white circles, or as bright rings, the size of the pupil. The eyes normal. Emm. S=1. Masturbation up to his 20th year. No tabes. I treated him with baths, derivatives, and strychnine for 1½ years without any improvement. Also the blue glass was of no benefit.

Case 4.—C. G., teacher, a healthy young man 23 years old, complains of photopsiæ, especially bright dots which move about, and the air between himself and the object appears to be continually trembling. M $\frac{1}{8}$ in either eye; S=1. Small crescent; interior of eye normal. Up to his 17th year he had daily been masturbating. Treatment with derivants, iodide of potassium, strychnine, was of no avail.

The history of the other cases is similar to those recited.

In girls it is obviously much more difficult to ascertain the facts. Yet I have the positive history of daily masturbation, continued for years, in three cases. One, a girl 15 years old, with S=1, Emm., and perfectly normal eyes, complained of continual dazzling before her eyes. A 27-year-old governess, Martha v. G., who for years had masturbated daily, most violently during her otherwise normal period, was troubled with white stars and bright red dots before her left eye. Clara P., a girl 16 years of age, had continued dazzling in bright light. Menstruation since her 12th year and quite regular. Her aunt states that the girl, in spite of all remonstrances, masturbates daily. S=$\frac{1}{12}$; the interior normal.

If we take the essential points of the above-related histories, we find *photopsiæ, subjective perceptions of light in young persons whose eyes showed a normal condition of the pupil, acuteness of sight tension, sense of space, light, and color, refractive media, optic nerve, and retina.*

A series of cases in which similar subjective perceptions of light were complicated with a high degree of myopia, small defects of the visual field, reduced color-sense, slight changes in the optic nerve or retina, have intentionally been omitted, although extensive masturbation had been acknowledged.

In the cases which I have related, the photopsiæ consisted in a dazzling, like an illuminated and moving window; or in a scintillation, as bright stars, wheels, flashes, circles, or dots, sometimes as snow-flakes and oscillating air.

In almost all the cases *both eyes* were affected, but in two (2 and 14) the white figures appeared on the temporal side of only *one eye.*

The dazzling was only once accompanied by a feeling of *pressure* in the eyeballs, but the photopsies led several times to real *photophobia*, and forced the patient to shut his eyes, especially when going from a dark into a bright room.

The photopsies were in many cases so troublesome that reading had to be interrupted after a shorter or longer period.

In the majority of cases the symptoms disappeared or were less marked in the *dark;* in all, except Nos. 2 and 14, they disappeared at once upon *closing the eyes.*

The *duration* of the photopsies varied between four weeks and several years; in one case they had lasted for twenty years.

The patients were mostly pale and delicate, only exceptionally robust, well nourished, and of healthy appearance (cases 3 and 4).

There was, in several cases, pain in the back, but no *tabes.* In one case the knee-reflex was not well marked, yet distinct; in the others it was always normal. But the greater number of patients complained of symptoms of *neurasthenia,* especially asomnia and pollutions.

The patients were between 15 and 30 years of age, mostly between 22 and 25; only one man was 36 years old.

They all confess to have masturbated for years, mostly several times daily; the majority from five to seven years, some ten, one even twenty-three years (Case 12), and two men had even continued after they had been married.

The acuteness of vision was never impaired.

The *smoked glasses,* which I prescribed, diminished the symptoms in many, but not in all cases.

The discontinuance of onanism and a moderate normal sexual intercouse produced in cases 1, 5, *and* 11 *a complete cure.* Case 1 had even a slight relapse upon repeated sexual excitement, which could not be satisfied.

It would be superfluous to make any conjectures as to the place in the brain, optic nerve, or retina where those photopsies are produced. Ophthalmoscopically nothing abnormal could be found, either in the retina or at the nerve-entrance. We know, however, that wherever on the long way from the eye to the centre of vision the irritation is felt, the *perceptions of light* will, according to the law of eccentric projection, be placed in the visual field. In this sense we might perhaps be entitled to speak of a *hyperæsthesia optici;* the cause of the irritation will probably lie in *the brain.*

II.—*Conjunctival Inflammations.*

I have found only one place in literature, in which a connection between persistent conjunctival inflammation and masturbation has been noted. Förster[1] says: "I can adduce a considerable number of cases of young persons, in whom masturbation has caused persistent and intractable conjunctival diseases which, under ordinary circumstances, are easily cured; they were very pronounced *hyperæmia, catarrhal inflammations, and trachomatous infiltrations* in persons between 12 and 20 years of age who had confessed that they had been masturbating, and which after months of treatment showed little or no improvement. The condition of the conjunctiva is analogous to the chronic catarrhal pharyngitis in persons with continued pollutions, which always relapses and cannot be completely cured."

Although I have not seen a large number of cases, yet I have six observations which completely confirm Förster's views.

Two cases were those of commercial travellers who when young had been masturbating, and who, after sexual excesses, noticed the following morning a redness of the conjunctiva and lid-margins, with a feeling of heat and pressure. How much excesses *in Baccho* may have contributed I am unable to say. Salves and eye-washes produced no benefit in either case.

The other cases showed hyperæmia of the conjunctiva, follicular and dry catarrh, which in three cases entirely disappeared when the daily masturbations were substituted by moderate sexual intercourse. One of these cases (5) had been treated by myself and several colleagues for five years with sulphate of copper in substance and different astringent solutions without any benefit.

III.—*Blepharospasm.*

It is well known that clonic lid-spasms are frequent in *chorea*, and even older observers, as Fautrel[2] and Wendt,[3] lay especial stress upon the influence of excessive onanism

[1] Graefe-Saemisch: "Handbuch der Augenh.," vol. vii, p. 102.
[2] Sédillot's: *Journal général de méd.*, vol. 39, p. 319, 1810.
[3] "Kinderkrankheiten," Breslau, 1835.

before puberty in producing chorea. Fautrel's patients were all onanists. Ziemssen,[1] however, remarks quite correctly that from the impossibility of obtaining reliable statistics, it will always remain difficult to regard it as the cause of or even as a predisposition to chorea.

In the ophthalmological literature I find only Michel's[2] statement: "Clonic spasms of the orbicularis muscle may be caused by continued work at near objects, especially by artificial illumination; the spasms are therefore produced by local exertion. *Excesses in Venere et Baccho*, and *great excitement* increase the predisposition."

I admit that in cases where a connection between the excessive masturbation and blepharospasm appeared quite probable, the counter-proof of ceasing of the spasm after the sexual function had been regulated, is wanting; they happened to be cases which I could not follow because they did not return after, or because of their confession. Yet I find so frequently, especially during the last years (formerly I did not pay sufficient attention to it), the note in my journal, "confesses excessive onanism," in cases of clonic blepharospasm (9–12 per thousand among about 30,000 patients), that I cannot deny the *probability* of a connection between the spasm and onanism. They were mostly boys or young men, from 8 to 20 years of age, who appeared delicate, and who had more or less frequent spasms of the lids. The spasm affected rarely one eye alone, and usually showed small fibrillar muscular contractions, but sometimes it appeared as a violent spasm of both eyelids. Points from which the spasm could be stopped by pressure, I have, just in these cases, never found. Some cases were associated with chorea minor, others with spasm of other facial muscles.

It is known that many causes may produce a reflex spasm of the lid. Broadbent[3] saw, for instance, the spasm appear as soon as the patient made an attempt to speak. I myself saw, some years ago, a young student who from childhood had blepharospasm, but only when he was

[1] "Handbuch," vol. xii, 2, p. 441, 1877.

[2] Graefe-Saemisch: "Handbuch der Augenk.," vol. iv, p. 443.

[3] *Med. Times and Gazette*, July 9, 1870.

spoken to, and whose eyes became filled with tears whenever he forcibly controlled the spasm. Since at present almost all cases of blepharospasm are attributed to reflex origin, why should not great sexual irritation produce spasms of the lids? Prof. Berger has of late years confirmed my supposition.

IV.—*Other Diseases from Masturbation Mentioned in Literature.*

Förster says: "Masturbation is also said to be the cause of *amblyopia*, but this is certainly a rare occurrence." In my case-book I find quite frequently noted in young amblyopic patients that they admit to have masturbated, but we have to be particularly careful in regard to the etiology in these cases. They were rarely emmetropes, mostly hyperopes, who often have a congenital one-sided or double amblyopia; or myopes of a high degree, in whom we often find a diminution of vision without marked changes in the background. These cases prove nothing definitively.

The same can be said of *hyperæmia optici*, which I have noted quite frequently in young persons, especially girls who had masturbated. The more thousands of normal eyes we examine with the ophthalmoscope, the more we find it difficult to define where a pathological hyperæmia begins, the physiological variations of the redness and distribution of blood-vessels of the nerve-entrance being very great. But apart from this slight hyperæmia I have often seen that real hyperæmia of the optic disc had been caused by the great exertion under the present system of school-education, which after 4–6 weeks' vacation has passed off entirely. It can hardly be determined in these cases how much had been due to overwork or masturbation. Mooren in his interesting paper, "*Disturbances of vision and uterine diseases*,"[1] gives a very graphic description of an affection of menstruating school-girls, which is accompanied with hyperæmia of the optic nerve, but with normal vision: "We sometimes notice a slight hyperæmia of the optic disc, but

[1] These ARCH., vol. xi, p. 281.

not sufficiently pronounced to lie beyond the limit of normal variations. The patients notice a feeling of heaviness, esp. in the frontal region. The symptoms, which ordinarily are quite bearable, become much more severe upon prolonged mental exertion, even without any strain of accommodation. The feeling of uneasiness may even be increased to nausea with drawing pain in the back of the head. The longer and more intense these symptoms are, the more difficulty they have in finding rest, being troubled by incessant imaginations and not having any refreshing sleep." I am surprised that Mooren, who is a most acute observer, has in his excellent description not pointed out the probability of a connection with masturbation. I have heard exactly the same complaints from girls with hyperæmia of the optic disc, who, as their mothers told me, were masturbating excessively.

But in the same paper Mooren, for the first time calls, attention to the connection between onanism and *weakness of accommodation.* Cases, as cited by him, are probably very rare. He says: "If the mere introduction of a vaginal speculum, as I have repeatedly observed, is, by the distention of the vaginal wall, sufficient to produce a transitory asthenopia in nervous persons, it is only a logical inference that prolonged masturbation will produce those symptoms in a much higher degree. Miss N., a robust-looking maid of 29 years of age, confessed that she had been masturbating since she was 15 years old. The *accommodative asthenopia* and the *sensitiveness to even moderate light* had from year to year become more troublesome. The small labia projected from the vulva like elongated cords; the unusually large clitoris formed the starting-point of those symptoms of irritation which would sometimes culminate in the most distressing dyspnœa, and I had to advise the amputation of that organ." In regard to a second case Mooren says: "A lady from South America, who, from the statement of her physician, had been masturbating from early youth, had such a degree of *hyperæsthesia*, that she could hardly bear the *lustre* of the eyes of other persons; the accommodation was at the same time so completely paralyzed (unfortunately

the age of the patient is not stated by Mooren), that for near vision convex 6 was required; there was, besides, great sensitiveness of the ciliary body, and some time previously objects had appeared to become more distant and smaller."

About *glaucoma* in onanism I find the following remark of Förster: "It is not only the weakened condition of the patients after febrile diseases, but also a faulty mode of living, as too early sexual excesses, etc., which lead to an outbreak of glaucoma." Förster mentions on the same occasion the case of a young man, 21 years of age, who confessed to have masturbated for years, and who, up to the time of the glaucomatous attack, had had a gonorrhœa which had caused him great anxiety, because he had to conceal it from his parents.

That *Basedow's disease* may also have some connection with excesses *in Venere*, is shown by the well-known case, described by both v. Graefe[1] and Förster,[2] of a young man who had wrestled with a girl for half an hour, but had not been able to overcome her energetic resistance. "He had over-exerted himself so much that he felt faint, and only recovered to a certain extent after taking several glasses of sherry. The palpitation which had appeared during the wrestling, remained; two days later he first noticed the protrusion of the eyeballs, which continually increased." After three weeks he showed a well-marked morbus Basedowii; pulse, 120, very strong heart-beat; moderate swelling and pulsation of the thyroid gland, and great protrusion of the eyeballs. Nine months later Förster found his condition unchanged. Sattler[3] also mentions that sexual irritation by onanism is, in older literature (Brück, Bouillaud, and Geigel), alleged as one of the causes which may increase the predisposition to Basedow's disease.

V.—*Views of Neurologists about the Dangers of Onanism.*

From the preceding remarks we see that the observation of eye-diseases as a consequence of onanism and other

[1] *Berl. klin. Wochenschr.*, 1867, p. 320.

[2] Graefe-Saemisch: "Handbuch der Augenkrankh.," vol. vii, p. 97.

[3] Graefe-Saemisch: "Handb. der Augenkrankh.," vol. vi, p. 976.

sexual excesses is of recent date; but the connection between onanism and cerebral, spinal, and other grave nervous diseases has long been known to the profession (and to the *laity*). Many of the older exaggerations have been properly refuted by more recent investigations, but some of the modern writers have fallen into the opposite extreme; for instance, Leyden,[1] who in the etiology of spinal diseases does not even mention sexual excesses. The most prominent neurologists, however, regard onanism, under certain circumstances, as a cause of psychical and somatic diseases, which must not be underrated; and it is important and not without value for the oculist, to learn the views of at least some of these men.

Griesinger[2] thinks that onanism is an important and frequent cause of *insanity*, and of psychical and physical degradation. He gives the following classical description: "The resistance against an overpowering impulse, yet always yielding to it; the secret conflict between shame, remorse, good intentions, and the irresistible impulse are, as many onanists confess, no doubt of greater importance than the direct somatic element. How much is due to either cause cannot be decided in the individual case; the effects of onanism appear to be the greater, the earlier in life the constitution is affected and the patient becomes anæmic, the more it is accompanied by painful reflections, and the more it causes local diseases of the genital organs. Where these three elements are wanting, masturbation will rarely have severe consequences."

In regard to the different forms of psychical affections, the following notes about hypochondria and brooding may not be without interest. Jolly[3] supposes that the excesses in masturbation are a much more effective cause of hypochondria than those *per coitum*, "because the former excesses are generally greater"; and also because it is more difficult to resist them. Berger[4] cites a case of brooding

[1] Erb: "Krankheiten der Rückenmarks." Ziemssen's "Handbuch," vol. xi, 2, p. 147.

[2] "Pathologie und Therapie der psychischen Krankheiten," 1861, p. 178.

[3] Ziemssen's "Handbuch," vol. xii, 2, 1877, p. 618.

[4] *Archiv für Psychiatrie*, vol. vi, p. 217.

observed by Griesinger, of an intelligent young merchant, 21 years old, who attributed his condition to excessive masturbation, practised from his tenth year; and another case, seen by himself, of a young man, 20 years old, who for years had had frequent nightly pollutions, generally three or four times a week, usually twice or three times in one night, and which resisted all modes of treatment.

Ziemssen (comp. above, blepharospasm), on the other hand, doubts a connection between chorea and onanism; and also Nothnagel, a connection between epilepsy and onanism. The older observers have been of the opinion that just the sexual excesses greatly contributed in causing epilepsy, and even thought that the coitus was a kind of epilepsy (*coitum parvam esse epilepsiam*); but Nothnagel has among all his epileptic patients seen only one case in which he could trace the origin of the disease to this vice. The rare occurrence of epilepsy compared with the frequent practice of masturbation is, according to Nothnagel, in itself sufficient proof. At the same time he says: "Yet the influences of onanism upon the nervous system are no doubt greater than even excessive normal intercourse." Berger's opinions are similar. A communication of A. Berger about the connection between writer's cramp and onanism is quite valuable. He says: "The influence of onanism is shown by the observation of two young persons, who, after having been absolutely unable to write, were completely cured after the cause had been removed; and this is so much the more important, as writer's cramp in the majority of cases is incurable."

In opposition to the general opinion of physicians and laymen, neither Berger[1] nor Eulenburg[2] are inclined to attribute a great influence to sexual excesses in causing *tabes*. Both authors think that colds, injuries, etc., are much more important causes, and that onanism is only a predisposing element. Remak also traced only one form of tabes, the cervical, to excesses *in Venere*. Erb, who directed his observations especially upon this point, found that sexual

[1] "Zur Aetiologie der Tabes dorsalis." *Breslauer Aerztl. Zeitschr.*, 1879, No. 8.

[2] "Lehrb. d. Nervenkrankheiten," Berlin, 1878, vol. ii, p. 459.

excesses had a decided influence in causing numerous spinal affections, as has also been observed by Romberg, Hasse, Hammond, and others. Erb contends "that every excess of natural or unnatural gratification of the sexual appetite, when practised for a long time, in many persons, not in all, considerably affects the spinal medulla and predisposes to disease." He supposes that the great excitement and commotion of the whole nervous system, and especially of the spinal medulla, with every ejaculation, is more injurious than the relatively small loss of substance.

Also Erb admits that many exaggerations have been published of the effects of masturbation, which is generally held to be more dangerous than the natural coitus. "This," he says, "does not appear very probable. The effect upon the nervous system must, for the man, be essentially the same, whether the friction of the glans is produced in the vagina or in some other manner; the nervous excitement accompanying the ejaculation remains the same, and the nervous excitement in coition would rather be greater. But the frequently repeated irritations at an early age are certainly dangerous, and there is no doubt that the consciousness of doing wrong, the constant struggle between a too powerful impulse and the moral duty, affects and exhausts the nervous system. But only the excessive onanism is harmful. If moderately practised it does no more harm to the spinal marrow than natural coition."

Conclusions.—If we sum up what myself, other oculists, and the most eminent neurologists have observed, we arrive at the following deduction:

Onanism, when practised excessively, can produce persistent photopsiæ, conjunctival inflammation, blepharospasm, paresis of accommodation, insanity, hypochondria, brooding, writer's cramp, and tabes; but, be it well understood, only *excessive* onanism.

The question therefore is: *Where does the excess begin?* This question can, in a general way, not be answered at all. Erb,[1] in his excellent book rightly says: "Whilst for some the Lutheran 'Once or twice a week' is all they can accom-

[1] Ziemssen's "Handbuch," vol. xi, 2, p. 148.

plish, others may with impunity do 4, 6 and 10 times [how long? ED.] as much. This seems to depend upon congenital differences of the sexual power, as we find it also in animals, for instance in stallions." A general rule can therefore not be given.

On the other hand, onanism is a wide-spread evil. As experienced a neurologist as Berger says in his lectures: "Masturbation is so generally practised that among 100 young men (and girls!) 99 at times do it, and the hundredth, the pure man, as I am used to call him, does conceal the truth."

In the course of nearly twenty years I have obtained statements of boys from different schools that all their schoolmates masturbate, and that, especially in the third and fourth classes, just at the time of puberty, it is practised most extensively.

Under these circumstances we might ask whether the present prudery of our pedagogues is warranted? Should we not also in this matter mind John Stuart Mill's words: "The diseases of society can, as little as the diseases of the body, be prevented or cured without discussing them openly." Are parents and teachers right in carefully avoiding to speak of onanism before their children, because the one or the other child thus far unfamiliar with it might be led to it? Should for one or two innocent children hundreds of onanists remain without intelligent advice? What can be done at school in this matter?

I answer the question from the recollections of my own school life. A very popular teacher had learned that the greater number of the boys in the junior class were masturbating very much. One day he gave us, to our great surprise and consternation, instead of a French lesson, a discourse on onanism. Properly avoiding every exaggeration, he described the bad results as to body and mind, admitted the difficulty of entirely resisting it, and in a friendly way advised, at least, moderation. I know from my school-fellows what an excellent effect this lecture had; masturbation did, of course, not cease at once, but it became less. The lecture had been instructive without causing hypochondria, as is generally done by popular treatises.

In which class the information should be given is difficult to say; the sophomore or junior class would probably be the most suitable.

That internal remedies do not lessen the impulse to masturbation, is established. Bromide of potassium, camphor, and lupuline have often been recommended and as often been pronounced useless. Cold sponge and sitz-baths, much active exercise and gymnastics, avoidance of erotic literature and erotic pictures, might be indicated; but youthful imagination and impulse will hardly be restrained by this. It is by no means proven that masturbation is less frequent in the country, where people are more fatigued by working in the open air, than in the city, where life is more easy and comfortable. Onanism among school-children in cities at the time of puberty is certainly promoted by the present mode of education, which, by the prolonged sitting posture, favors in an unjustifiable manner an increased flow of blood toward the sexual organs. Physicians and teachers would be the proper persons openly to discuss this question.

I hope that ophthalmology, which during the last ten years has given many useful hints in regard to school-hygiene, will also in the question of masturbation begin the contest with old prejudices.

Concerning adults, physicians seem to agree with Prof. Benedict, who says: "There is no better remedy for onanism than well-regulated natural coition." How to avoid the conflict between morality and natural inclinations is a question requiring the most careful discussion.

REMARKS ON 177 OPERATIONS FOR ENTROPIUM AND TRICHIASIS.

By F. C. HOTZ, M. D., Chicago, Ill.

THE author of a new operation or of a modification of an old method ought, after a few years, to give a candid report of his experience. If his operation has proven a success, the profession will readily adopt it; if a failure, it is no less important for the profession to know it. But sometimes we do not learn of the results because they have not been very brilliant. For fear, therefore, my silence might be misinterpreted, I wish to give a brief report of the results I attained in the past four years by the operation for entropium and trichiasis published in volume viii, No. 2 of these Archives. And at the same time I wish to supplement my former paper by a few remarks on the operation.

The essential features of my operation are these: The skin of the eyelid is incised transversely in the line of the upper border of the tarsus of the upper lid (or along the lower border of the tarsus of the lower lid); the muscular layer covering that border of the tarsus is excised (about 3 to 4 *mm.* in width); and the cutaneous edges of the incision are brought in close adaptation with the cartilage by sutures which are passed right through the border of the tarsus and the tarso-orbital fascia.

The success of the operation depends a great deal on the correct incision; it is, therefore, of paramount importance that the surgeon has a clear idea of this point. Now, I have several times seen my incision described as being made

2 *mm.* above the free border of the eyelid. Nothing could be more erroneous than this statement! Perhaps the error was caused by my saying (*l. c.*, p. 255): "I apply the point of a scalpel at a point 2 *mm.* above the inner canthus and draw a horizontal incision across the lid to a point 2 *mm.* above the external canthus." He, of course, who had read the preceding passages with attention, and only looked at the wood-cut accompanying the description, could never get so false a conception; for it was expressly remarked the incision should follow, as closely as possible, that furrow which is the border line between the skin of the eyelid and the supra-tarsal integument. This furrow (in the upper lid) describes a curve beginning 2 *mm.* above the inner canthus, and ending 2 *mm.* above the outer canthus, but its centre is from 6 to 8, and sometimes even 10 *mm.* removed from the cilia. But as the free mobility of the tarsal skin makes it exceedingly difficult to make the curved incision with the desired precision and nicety, I suggested temporarily to change the curve into a straight line: "I seize, between thumb and forefinger, or with a pair of forceps,[1] the centre of the free edge of the lid and draw it downward until the skin is moderately stretched. As both the commissures are fastened to the bones and thus rendered immobile, the centre of the lid alone is affected by this traction, the free edge obtains a convexity downward, while the curved furrow which marks the upper border of the cartilage is reduced to a straight horizontal line." In other words, the centre of the furrow and the centre of the ciliary edge are displaced downward at the same rate, their original distance being uninfluenced by the traction. Consequently, an incision which follows that furrow while temporarily drawn out to a horizontal line, begins and ends 2 *mm.* above the commissures, but its centre recedes from the lid border 6, 8, or 10 *mm.*, according to the varying width of the tarsus. This incision sacrifices nothing of the tarsal skin; the lid retains after the operation its original integument, and in consequence thereof its natural appearance and unimpeded movements, so that this operation, judged by its cosmetic effect, may be considered superior to all other procedures.

[1] If the eyelashes are too short to offer a good hold to the fingers.

Some surgeons, I have noticed, make the incision too near the cilia, because they seem still to believe the eversion of the inverted lid requires a strong traction, obtained from the forcibly stretched skin. I explained on former occasions why this opinion is wrong and should be dropped, and my numerous operations are the best practical evidence in support of my theory, that a very small force and a slight tension of the skin are sufficient for the cure of entropium, provided the tension proceed from a fixed point, such as the upper border of the tarsus offers.

When the skin of the eyelid is very flaccid and wrinkled, or when the excision of a wedge-shaped piece of cartilage is contemplated, whereby the width of the cartilage would be diminished, only in these cases may the incision be made below the oft-mentioned furrow to avoid having a superabundance of skin after the operation. But should the incision be made in the furrow and the tarsal skin afterward be found superabundant, the mistake can easily be rectified by the removal of a narrow strip of skin from the lower border of the wound. At all events, it is better to make a mistake in this rather than in the opposite direction; for if the tarsal skin turns out to be too wide, it can easily be shortened; but if too short, it cannot be lengthened. An evil consequence necessarily resulting from the short-cut skin is the great difficulty of uniting the edge of the tarsal skin with the upper border of the tarsus. Either it cannot be done at all, or only by unduly stretching the skin. In the first instance, the sutures cannot pass through the border of the tarsus at all; and in the second case, the tension being too great, they are likely to cut through prematurely, allowing the abnormally stretched piece of skin to recover its natural state, in which it is wholly insufficient to cover the whole surface of the lid and to unite with the upper border of the cartilage.

Only when the tarsal skin becomes firmly united with the border of the cartilage the permanent success of the operation is insured. In the highest degrees of entropium and trichiasis, with much contraction and incurvation of the tarsus, it is a common occurrence that the upper border is as much

curved in as the lower; and the edge we see after removing the muscular layer is not the real upper line of the cartilage, but the angle of incurvation. In order to avoid mistaking the apparent for the real upper border, and to make sure that the sutures hold the real border, I have adopted the following plan: After the needle has been drawn through the cut edge of the tarsal skin, I prick it into the cartilage near its upper border, and with it lift the lid off from the eyeball far enough that I can push one prong of a finely-toothed forceps from above downward between the lid and eyeball, while the other prong passes down in front of the cartilage. In this way the upper border of the tarsal cartilage must get between the prongs of the forceps, which hold it so well that the needle can transfix it with the greatest precision and safety at the properly selected point. I have never seen any untoward symptoms arise from this manipulation.

Canthotomy and canthoplasty were often performed in connection with my operation, and in all cases presenting a thickened and contracted tarsus Streatfeild's grooving was combined with the operation. The splitting of the tarsal edge has been discarded as useless; its immediate effect upon the position of the eyelashes is very nice, to be sure, and lasts about as long as the gap in the lid border. When the gap is filled with granulations, the inevitable contraction of the cicatricial tissues will do its work so thoroughly that the gap is contracted to a fine linear scar in the tarsal edge, and the eyelashes, yielding to this traction of the scar, begin to bend down again. The same objection applies to Ammon's and similar incisions made behind and parallel with the tarsal edge into the conjunctival surface of the lid.

And now a few words about the **results of my operations**. In the space of four years (Sept., 1878, to Oct., 1882) I have performed 177 operations for entropium and trichiasis, of which 142 were on the upper lid and 35 upon the lower lid. Among the cases there were all sorts and grades of inversion represented. Although I have kept a careful record of all the cases, noting the state of the lids before the opera-

tion, the healing process, the result at the time when the patients were discharged, as well as the condition of the lids at subsequent examinations (when such opportunity offered itself), I shall not annoy the readers by statistical tables, but content myself with saying that the results generally have been satisfactory in the highest degree, and that I value the operation the more the oftener I have performed it. Among all the 177 cases there was not one in which the operation failed directly. In several cases, I admit, the eyelashes were not everted as much as I expected after the sutures were tied; but upon re-opening the sutures—as I always did under these circumstances—I found the imperfect effect to be due to faulty application of one suture or the other. Either the thread had not passed through the border of the cartilage at all, or only so superficially that it cut through when the knot was tightened. The readjustment of the faulty sutures always had the desired effect upon the position of the cilia. "Haste makes waste" and is not compatible with my operation which will therefore not likely be a great success in the hands of those who can spare but five or ten minutes for a lid operation.

My tables record 12 relapses in 142 operations for entropium of the upper lids. In 3 of the 12 cases partial entropium had occurred near the canthus; these cases belong to the first stage of the operation, when I yet thought the cilia nearest to the canthus could be everted permanently, without the deep sutures, by the removal of small triangles of integument. Since I have dropped this procedure and employed the deep sutures alone, I have not seen a relapse of this kind.

Four other instances of relapse also belong to the initial period of this operation. The lids presented the highest degree of inversion, and very marked incurvation of the cartilage, for which at present I consider grooving an absolute necessity. For the sake of an experiment, however, I did not groove the cartilages of those lids, because I was curious to see how much my method alone, without the aid of other means, could achieve in these worst forms of entropium; and I was gratified to see that even under such

unfavorable circumstances, the eyelashes could be turned enough to clear the eyeball without one particle of skin having been excised; but the eversion of the tarsal edge was not complete so as to prevent a relapse. In repeating the operation the tarsi were grooved, and results obtained which two years later were still perfect.

The eighth case of relapse occurred in a patient suffering from inveterate lues (which fact was not known to us at the time of the operation); the wound healed very imperfectly, and re-opened after two weeks to reveal extensive ulceration, proceeding from the groove in the tarsus. Relapses 9 and 10 occurred in a young lady who returned to her home in Minnesota ten days after the operation. When she left, the lids were in very nice condition, but at home (possibly from the effects of the severe cold weather in January), the lids became swollen, painful, and extremely sensitive to cold air. This state lasted about four weeks, and when the patient came back to the city her eyelids were still very tender upon pressure and sensitive to cold. It seemed to me that an inflammation and softening of the tarsus had taken place, and that under these circumstances the tarsal edge had again yielded to the traction of the very atrophic conjunctiva. In two instances, finally, the retro-tarsal fold of the conjunctiva was obliterated, and the height of the cartilage reduced to five *mm.* by atrophy of the conjunctiva and cartilage. In such cases the prospect for permanent improvement is very dubious; the fornix being obliterated, the lid is tied down, as it were, to the eyeball, which drags it along in its rotation. This continuous dragging creates chronic irritation and inflammation of the tissues of the eyelid, and in this way leads to further shrinkage of the component parts of the lid.

This extreme shrinkage of conjunctiva and tarsus is a very important factor in the results of the operation upon the lower lid, and has rendered a permanent relief impossible in three cases. In two other cases, however, the relapse must be charged to a faulty application of the sutures. In repeating the operation, it was discovered that the tarsus was unusually broad, and its lower portion was strongly

bent inward, so much so, that the angle of the bend had been taken for the lower border of the cartilage, and the sutures been put in the wrong place.

As I could not examine every case at some later period, I can, of course, not claim that these seventeen cases represent the actual percentage of relapses; on the contrary, I have no doubt that their number is greater, because I have operated on other cases under the same conditions as those which were followed by relapses. I mentioned the above cases simply to point out some of the influences which can affect the result of the operation, and to show that some of the causes have no particular relation to the operation I employed, but will have the same bad effect upon the results of any other method. From my whole experience, I dare say that relapses will occur comparatively seldom, provided the operation be done with care and accuracy.

Among my cases there were fourteen upper eyelids upon which other operative methods had been tried for the relief of entropium. In the most cases Arlt's operation had been performed; and it was interesting to observe how seriously the movements of the upper eyelid are impeded by the removal of the tarsal skin, and that the degree of the disturbance stood in close relation to the size of the excised integument. In these cases we must take particular pains to make the incision in a line with the upper border of the tarsus, because after the transverse incision is made, the skin which was stretched and dragged out of place by the previous operation will shrink so much that there will not be enough to cover the whole lid with if the incision be made lower than the upper border of the tarsus. The skin must be dissected off from the tarsus clear down to the eyelashes by dividing all the cicatricial bands connecting the two parts; the cartilage being grooved, the sutures are put in. In this way I succeeded in relieving the entropium as well as in restoring to the eyelid its free and easy movements.

Operations for entropium producing perpendicular scars upon the eyelid are a gross offence against good taste and cosmetic laws, and the sooner they are excluded from the

sphere of legitimate surgery the better. Twice I had occasion, in operating for entropium, to relieve the lid of the hideous deformity produced by such perpendicular scars.

With a few exceptions, the after-treatment consisted in the application of wet compresses during the first twenty-four hours; in six cases, borated cotton was used instead. First union was obtained in 140 cases; in thirty-seven cases pus showed itself in the sutures on the second or third day. The constitutional condition of the patients seemed to influence the healing process more than any other cause; among forty-three patients whose constitution was weakened by scrofula, anæmia, malnutrition, etc., suppuration occurred twenty-four times, while among the 134 robust patients the healing was disturbed in seven cases only.

Reviewing the results of my operations after a four-years' trial, I can say that they have well sustained and corroborated my former statement, that this operation possesses the following advantages and meritorious features:

1. That it accomplishes its purpose (relief of entropium) without the slightest destruction of skin.

2. That for this reason it can be employed in cases where other methods are impracticable on account of excessive shortness of the integument of the lid.

3. That it does not mutilate the lid or in any way interfere with its movements.

4. That in a case of relapse it can be repeated without in the least disturbing the natural appearance of the lid.

5. That the tension by which the inverted eyelashes are turned back to their normal position is rendered independent of the movements of the lid, because the distance between the two points upon which the tension is to exert its influence, viz., the upper border of the tarsus and the free edge of the lid, remains the same whether the lid is raised or dropped; while where the entropium is relieved by the shortening of the integument, the tension is subjected to considerable variations, because it is regulated by the distance of the free edge of the lid from the supra-orbital margin. This distance varies with the movements of the eyelid: it is greatest when the lid is closed, and therefore in

this position of the lid the tension exerts its greatest influence upon the tarsal edge; but when the lid is raised, its free edge approaches the supra-orbital margin; consequently, the integument between these two points becomes relaxed, and the tension is greatly diminished, and may even be reduced to zero. Under these circumstances, therefore, the upper lid can appear everted when closed, and inverted when open.

December, 1882.

OBSERVATIONS ON DETACHMENT OF THE RETINA.

By Prof. C. SCHWEIGGER, M.D., Berlin.

Translated by Rosa Welt, M.D., New York, Clinical Assistant to the N. Y. Ophthalmic and Aural Institute.

DESPITE the frequent occurrence of detachment of the retina, its mechanism is not sufficiently cleared up. It is essential to bear in mind that the primary stage of detachment is usually unaccompanied by changes of eyeball tension. As much liquid as is found between choroid and retina is lost to the vitreous, and as quickly as the detachment extends, the vitreous will disappear; indeed, it disappears more rapidly. The theory of Heinrich Müller, that diminution of the vitreous is the cause of the detachment, is perfectly justifiable from an anatomo-physiological stand-point, and I have myself described a confirmatory case in *Gr. Arch.* (vol. ix, 1, p. 199). We must, however, consider some other possibilities.

The opinion of Leber,[1] that detachment is preceded by laceration of the retina, appears quite probable in many cases; yet I would not ascribe so great influence to shrinkage of the vitreous as Leber does in his paper. The retina may tear even if the vitreous is perfectly normal. The tightly-stretched retina of a myopic eye may rupture by slight external force, and the consequences manifest themselves only after some time, when the liquid, oozing slowly from the vitreous through the opening, has accumulated

[1] Transactions of the Heidelberg Ophthalmological Society, 1882.

in a sufficient quantity behind the retina to cause detachment, with its subjective and objective symptoms.

The tight and thinned retina of the myopic eye may tear even spontaneously. In the second edition of my text-book (1873) I have stated that ruptures of the retina are not infrequently noticed in recent cases of detachment, but if they are in the upper part they cannot be recognized when, by gravitation of the liquid, the lower part of the retina has become detached and the upper re-applied.

Ruptures of the retina are, therefore, more frequent than we can detect them, apart from the fact that it is difficult to recognize the majority of them on account of their peripheric situation. On the other hand, mistakes are possible, as depressed parts between the raised folds of the detached retina may be so close to the choroid that the red reflex of the fundus in these places may impose for a perforation of the retina.

The occurrence of ruptures by shrinkage of the vitreous, as Leber admits, is possible, of course, yet I have never been able to confirm it ophthalmoscopically; moreover, the edges of the perforation, with their tongue-like shreds, are always rolled outward, whereas a traction from the vitreous would roll them in the opposite direction.

It is probable that detachments occur in different ways. The differences in their course and termination very likely depend on the differences in the primary morbid processes. The final issue in irido-choroiditis is by no means so general as is usually supposed.

Be the pathogenesis of the detachment as it may, the greatest difficulty of explanation is always offered by those cases in which large detachments appear to have occurred suddenly.

It may, however, be that detachment does not extend in proportion to the disturbances of vision, which most alarm the patient. I have noticed, though rarely, detachment of the retina in patients who were not conscious of impaired vision. Nevertheless, it is possible that the detachment extends slowly until it becomes of a certain size and then suddenly impairs the vision, the liquid changing its location.

For instance, a temporal part of the retina, from the periphery to about 60°, could be detached without the patient noticing it, as this part of the retina is not very susceptible to light. It may also be that detachment occurs so often in myopia because the lesser resistance of the sclera might permit an accumulation of a very small exudation before a corresponding quantity of vitreous is absorbed. This process is a rapid one, as Donders has shown, and it may be repeated any number of times until a large exudation has accumulated.

The same difficulties encountered in endeavoring to explain the origin of detachment of the retina will be found in considering its therapeutics.

It is certain that, even if there were as much liquid in the vitreous as behind the retina, and though we could remove the exudation by a so-called antiphlogistic treatment, it must necessarily accumulate again if we cannot furnish the corresponding quantity of vitreous. If a pressure bandage at all assists the absorption of liquid, the result would be the same for the vitreous as for the detachment. Punction, it is true, has the advantage of removing a considerable quantity of the exudation; but as the liquid is removed by the elastic tension of the sclera, the former intra-ocular pressure is restored as soon as the scleral wound is healed, generally through a re-accumulation of the subretinal exudation; also, though exceptionally, through an effusion into the vitreous, accompanied by reattachment of the retina. This is much more likely to occur in cases where punction is performed before the process of secretion is thrown into wrong channels. At all events, and provided the retina be not perforated spontaneously, I consider early punction in connection with a regular diaphoretic treatment the most rational course, and the chances of success the greater, the smaller the detachment. For several years I have preferred for the diaphoretic treatment sodium salicylate to pilocarpin, which produces many unpleasant symptoms. I give 2.00 grams in 0.5 doses every ten minutes, and have the patient wrapped in woollen blankets; the diaphoresis to be continued for several hours, during which the patient may take weak tea.

A reason which must induce us to continue the therapeutical experiments is the occurrence of spontaneous reattachment. These cases are, however, so rare that we are justified in communicating some such instances, especially if the cure was complete and lasting.

Case 1.—Miss Schultze, twenty-eight years old, came under my treatment in January, 1874, on account of recently impaired vision in her left eye. No. IV. (Snellen) was read with difficulty at six inches. The field of vision was defective in the inner-upper part; distinct eccentric vision only in the external and superior parts. More than the lower half of the retina was found detached; the choroid scantily pigmented, and on the optic nerve there was a posterior ectasia. In the right eye, M=$\frac{1}{8}$; V=$\frac{10}{30}$; choroid also poorly pigmented and somewhat ectatic. As the patient was the daughter of a physician, there was no object in withholding the gloomy prognosis of this disease, and for that reason nothing was prescribed, excepting a mild laxative and foot-baths. Until April the patient was examined frequently, but no change was noticeable. In the following November she presented herself again, and was found to be very much improved. In the left eye V was then= $-\frac{1}{10} \div \frac{1}{10}$. No. II. (Snellen) was read at six or seven inches. The eccentric vision, however, was somewhat uncertain in and upward. The detachment had completely disappeared. A light gray band, corresponding to the upper boundary of the former detachment, narrow near the optic nerve, but expanding toward the periphery and dotted with dark pigment, started somewhat above the optic nerve and ran from here about horizontally toward the periphery. In its further course there were found on the outer-lower part of the choroid dark pigment spots extending over the space of about two diameters of the optic nerve.

The cure was permanent, and in April, 1880, when the patient last visited us, the vision in the left eye was $-\frac{1}{8} \div \frac{5}{15}$ to $\frac{5}{12}$. I repeat that, excepting the above-mentioned rather indifferent treatment, nothing was used. The patient had, without straining her eyes, attended to all her household duties.

Case 2.—Mrs. C., fifty years old, came under my care in February, 1877, on account of impaired vision in the left eye, which had been noticed since November, 1876. Both eyes were highly myopic; M=$\frac{1}{36}$, V=$\frac{5}{12}$. With the left eye she could read No. III

(Snellen) fluently, but there was a defect in the upper part of the field of vision. Posterior ectasia was found in both eyes, slight in proportion to the myopia, as it extended only over about one half the diameter of an optic nerve. In the left eye the lower portion of the retina is detached, but shows very little discoloration; the exudation, therefore, probably was transparent. As the patient lived in a neighboring city, and could not remain under my care, only a mild laxative treatment was prescribed. In April, her condition was found unchanged. In May, 1878, there was no detachment whatever. All that had remained was a slight defect in the visual field between 30° and 40,° which was otherwise normal. Even the prescribed laxative treatment had not been strictly followed, as the patient had travelled through Italy during May and June, 1877.

But not always does the re-attachment of the retina result in improvement of the vision. Of course the latter can only take place if the detachment was the only cause of impaired vision, and if the texture of the retina remained uninjured in the meanwhile. The detachment may disappear, though the retina be otherwise diseased.

Case 3.—Mrs. L. began to be treated in October, 1874, for a detachment of retina extending over the lower half of the left eye; only No. XX (Snellen) could be read. The right eye was very myopic. With $-\frac{1}{4}$ V=$\frac{12}{100}$. No. I$\frac{1}{2}$ (Snellen) was read with difficulty at two inches. A large staphyloma posticum and choroiditis of the macula were found on ophthalmoscopic examination. The weakness and nervous condition of the patient prevented all energetic treatment; but in Feb., 1875, the detachment was found to be visibly diminished.

Four weeks later atropia was instilled, and then, upon examination, the retina was found completely re-attached. Besides a large irregular post. staphyloma of a diameter of 2–3 optic nerves, there were remains of choroiditis in the region of the macula, which appeared as light atrophic spots and some dark pigment spots; some pigment was also found on a retinal vessel. Similar changes were seen in the upper part of the choroid, which was otherwise normal; the vitreous contained some opacities. Central vision had become worse, and No. XX (Snellen) could not be read. A thorough examination of the visual field was impossible

on account of the patient's condition. An examination in April, 1881, gave the same result. The other (right) eye remained unchanged during this time.

Case 4.—In August, 1875, the following case entered the department of eye diseases of the Charité, at that time under my management. Its detailed description was published by Dr. Herter in the *Charité-Annalen* (2 Jahrg. pag. 519), entitled: "Gravidität im 8ten Monat. Retinitis albuminurica mit Netzhautablœsung beiderseits." When the patient was admitted the ophthalmoscopic examination showed a retin. albuminurica in both eyes. Retinal veins were enlarged and tortuous. Retina opaque, large shining patches reach to the papilla where they become confluent; toward the equator they appear as small, shining spots. In the region of the macula we find, toward the left, small transparent spots, and a slight hemorrhage toward the right. Throughout the other parts of the retina there were only occasional small band-like retinal hemorrhages; near the equator there were occasional isolated changes of the choroid, consisting in discoloration of the epithelium and accumulation of pigment. Finally, we found a very extensive detachment in the lower parts of both eyes. The detached retina was in some parts of a light gray color, in others as yet distinctly red. Floating movements were not noticed. The vision was very poor. The patient saw movements of the hand at 15′, and counted fingers at one foot with either eye. A defect in the field of vision corresponding to the detachment of the retina existed, but it could not be determined exactly on account of her very poor sight. The patient remained only one week in the Charité, was confined in October, and presented herself again at the policlinic of the university in November, 1877. On examination with the ophthalmoscope she is found to be emmetropic in both eyes. The optic nerve is whitish and opaque; the retinal vessels are thin, and close to the optic nerve partly accompanied by short light bands (thickened adventitia). Chorioiditis disseminata is seen in the fundus, also black dots and light spots. In the right eye a small white band is drawn from the upper margin of the optic nerve, horizontally over the macula, and bends downward. It is broadest between the optic nerve and the macula, and is also dotted with black pigment spots. In the left eye two similar bands pass from the optic nerve toward the medial side. In the region of the macula lutea there are also some pigmented spots. No trace of the detach-

ment can be detected in either eye. V. was hardly improved since Aug., 1875 ; with $+\frac{1}{6}$ No. 4.0 was read with difficulty.

It is well known that detachment of the retina, though rarely accompanying retinitis albuminurica, has in these cases a remarkable tendency toward spontaneous recovery.

In conclusion I wish to communicate a case, in which puncture rendered a brilliant, though unfortunately not permanent, result.

Case 5.—Olga H., twenty years old, came under my treatment on the 21st of March, 1879. The vision in the left eye had been defective for twelve days. R. eye myopic ; with $-\frac{1}{4\frac{1}{2}}$, $V=\frac{6}{36}$. No. 0.3 was read at ten centim. The left eye could only discern certain words of 0.75. There was in both eyes a moderate sclerectasia of about one third of the diameter of the optic nerve. In the left eye the inferior external portion of the retina was detached up to the equator. On April 21st, punction was performed with a small cataract knife, and a clear, watery, somewhat yellowish liquid was removed. On April 29th atropia was instilled, and at the examination no trace of the detachment could be discovered ; $M=\frac{1}{4\frac{1}{2}}$; $V=\frac{6}{36}$. No. 0.3 was read at ten ctm. On examination with the perimeter the field of vision was found to be perfect. This favorable condition remained until May 1, 1881. On the 5th of May a detachment of retina was found outward and above. $M=\frac{1}{4}$; $V=\frac{1}{6}$. On the 12th, punction was performed in the same manner as before, outward and above. On May the 23d, the formerly detached retinal portion had quite a normal appearance ; in looking above-outward, corresponding to the punctured part a small retinal hemorrhage was seen. A few days later the detachment had reached its former size.

SYPHILITIC GUMMA OF THE SCLERA.

By J. A. ANDREWS, M.D., of New York.

LATE ASSISTANT SURGEON TO THE MANHATTAN EYE AND EAR HOSPITAL, NEW YORK.

(*With a wood-cut.*)

OF gummous nodes in other parts of the eye than the iris, those situated in the sclerotic are of rare occurrence. The publication of the following case may be justified the more, because of its interest with regard to the differential diagnosis:

C. R., stone-cutter, aged forty years, applied for treatment at the Manhattan Eye and Ear Hospital, New York, July 29, 1878. The patient stated that about June 1, 1878, he "got sand into his left eye," in consequence of which the eye became "red and swollen." From this accident he dated the eye trouble for which he sought relief. On the occasion of his first visit to the Manhattan Eye and Ear Hospital the appearance of the left eye was as follows: The entire ocular conjunctiva was intensely injected. At a point beginning about 2‴ from the upper part of the limbus corneæ the conjunctiva rose in an oval, cushion-like swelling, half an inch in its horizontal, and three eighths of an inch in its vertical measurement, with a large central depression filled with pus. In the centre of the depression, surrounded by pus, was a dark spot about 2 *mm.* in diameter. The removal of the pus showed the base of the depression to be ulcerated, and the dark spot just mentioned to be a projection through the ulcerated sclerotic. The upper lid could not be elevated voluntarily, and the projection of the swelling on the sclerotic produced a marked deformity. There was no active iritis, but there were posterior

synechiæ from an old iritis. I suspected that the sore was due to constitutional syphilis, but the patient denied ever having had venereal disease. I wrote to the physician at one of the eye and ear hospitals in Boston, under whose care the patient had been previous to visiting the Manhattan Eye and Ear Hospital. The reply was that the case had been recorded, July 10, 1878, as one of "abscess of the ocular conjunctiva (?)." He "made an incision into the swelling, expecting to reach pus; none came, however," and he "came to the conclusion that there was some trouble with the fundus oculi, possibly a growth."

When the patient visited the Manhattan a second time, I de-

sired him to remove his shirt, and several tubercular syphilides were seen on his back. This discovery, of course, placed the diagnosis at rest. The vision of the affected eye was $\frac{3}{200}$. Owing to the cloudiness of the vitreous no ophthalmoscopic examination of the fundus could be made. Under anti-syphilitic treatment the local affection rapidly disappeared, and the visual power, by August 14, 1878, had improved to $\frac{20}{200}$. The patient was absent from New York, from the latter part of August till the middle of January, 1879, during which time he took his medicine regularly, with the exception of periodic interruptions which he had been directed to observe. On January 20th the disease was recognizable, solely by a very slight bluish tinge of the sclerotic, and by some thickened blood-vessels radiating in the conjunctiva above it. Left eye, $V=\frac{20}{40}$. The patient was seen no more after March 15, 1879.

In the above case two other similar affections had to be thought of, *i. e.:* scleritis, and sclerotico-choroiditis anterior. Both of these affections certainly did exist, although there was no increased intra-ocular tension. The presence of gummous deposit in other parts of the body fixed the nature of the inflammation.

Nearly all ocular affections of a syphilitic nature consist of some form of transition between the second and third periods of the disease, and generally occur coincident with accidents of the same nature on the cutaneous surface. But the only affection of the eye pathognomonic of syphilis is of the gummous variety, and this, with very rare exceptions (Mauthner, in Zeissel's "Lehrbuch der Syphilis," Bd. ii; Sichel, *Gazette Hebdomadaire de Méd. et de Chir.*, April 23, 1880, p. 262; Siggel, These ARCHIVES, vol. ix), occurs as a late secondary accident.

Plastic iritis, on the other hand, although much more frequently met with than the gummous form, has nothing in itself characteristic of the disease in question. Although it has been maintained that the sclerotic is, almost without exception, only secondarily drawn into participation by extension of a node from the ciliary body or choroid, and the case above recorded was seen too late to afford an absolute foundation for contradicting the correctness of this; nevertheless, the statement of the patient that there had not, at any time, been pain in the eye, and that the disease was far advanced before any diminution of sight was observed—the patient having frequently closed his well eye to determine whether the sight of the fellow-eye was good, —would perhaps favor the opinion that the disease was primarily seated in the sclerotic, and extended inward by ulceration. Whatever may have been the primary seat of the lesion in the above case, the result was certainly very gratifying, and, judging from the literature of gummy deposit in the eye, the case may be well worthy of being placed on record.

A CASE OF COLOBOMA OF THE CHOROID AT THE MACULA LUTEA, UNACCOMPANIED BY COLOBOMA OF THE IRIS.

By SWAN M. BURNETT, M.D., Washington, D. C.

(*With a wood-cut.*)

COLOBOMA of the choroid, without a concomitant coloboma of the iris, is not so common as to render such cases entirely without interest, particularly when the defect occupies the region of the yellow spot. I therefore put another case on record.

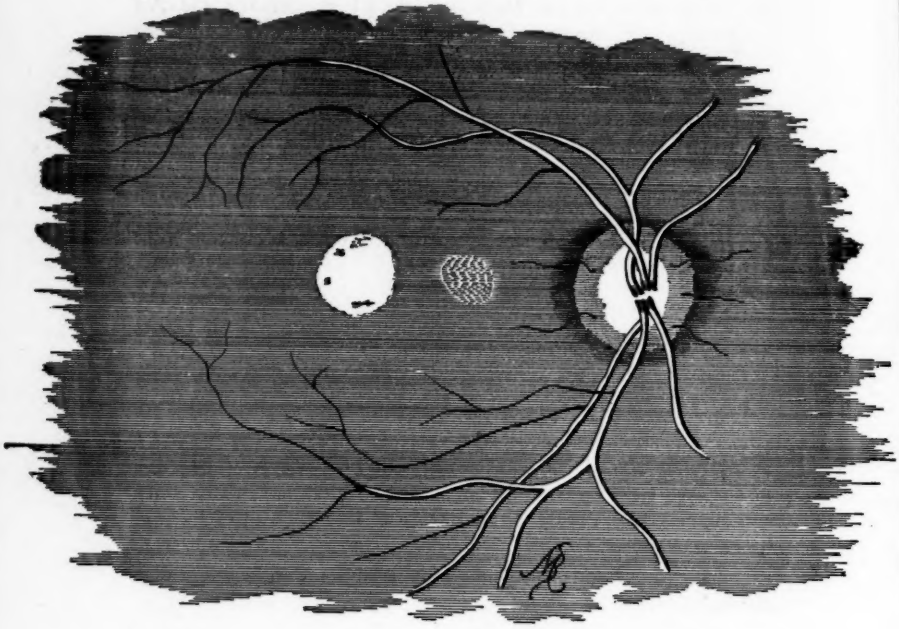
Wm. H. B., a white boy of thirteen years, applied to me for relief of an asthenopia of the *left* eye. I found this eye to have a simple myopic astigmatism of 0.75 ; axis 90°; V=$\frac{4}{5}$. The *right* eye suffered from a divergent strabismus which had existed since infancy, and had V=$\frac{4}{60}$, with no special improvement by either spherical or cylindrical glasses. He also suffered in this eye from that sudden abolition of vision which I have found frequently in strabismic eyes.

The object, while looking at it with the normal eye closed, will suddenly vanish, leaving a perfect blank. On closing the eye, however, and then looking again, vision is as before ; but any attempt at fixing an object attentively is followed by its complete disappearance for a time.

There can be no question, I think, that this phenomenon is cerebral in its character. It is the habit of the patient to suppress entirely the mental image of this eye in order to avoid the confusion of double images, and in time the cen-

tre of vision in the brain seems to lose the power of retaining an impression for any considerable length of time.

The iris was perfectly normal and the pupil of the same size and motility as that of its fellow. On making an ophthalmoscopic examination I found quite a remarkable change at the region of the macula lutea. About one and a half disc diameters to the



outer side of the papilla, there was an almost perfectly circular white spot. Its edges were very sharply defined, as though it had been cut out with a punch, and there was no accumulation of pigment at its border or anywhere in its vicinity. A few dots of pale pigment were seen on the surface of the spot, but otherwise it was dead white. It had no vessels, nor were there any vessels running up to its edge. The choroid around it appeared perfectly normal, except that about midway between the coloboma and the o. d. there was one spot where it appeared a little thin. The

coloboma was about one half the size of the o. d. The o. d. itself seemed entirely normal. There was no crescent, and the vessels in calibre and course were about as usual. The appearance of the fundus is given in the accompanying figure. The refraction as estimated by the O. S. was emmetropic, and there was no difference in the level of the white spot and the remainder of the fundus. The visual field was normal, there being no scotoma corresponding to the choroidal defect. His color-perception was good, and I was not able to detect any deficiency in this function at the centre of fixation, according to the test for small central scotoma recommended by Dr. Minor,[1] which consists in placing before the patient large sheets of different colored papers in succession and noting if there is any defect in the field.

Manz in his article on the congenital anomalies of the eye,[2] refers to but four cases of isolated coloboma of the choroid at the macula.[3] In Streatfield's case it was circular, and about twice the size of the o. d.; in Talko's,[4] pear-shaped, and three times the size of the o. d.; in Reich's,[5] rhomboidal, with the long diameter the size of the o. d.; in Wecker's,[6] four times as large as the disc, and nearly circular. In all these cases V was below the normal, except in that of Reich, where it was nearly $\frac{20}{10}$. In Streatfield's case, as in mine, there was strab. divrg. and a high degree of amblyopia. In Talko's case the V. F. was concentrically narrowed one half. The color-function was not noted in any one of the cases.

In the case related by me, it might be a question as to whether it was a congenital anomaly or a condition produced by inflammation or injury—particularly as the boy's mother gave a history of two injuries to that eye—one from the explosion of a fire-cracker, and one from a toy arrow. The appearance of the fundus seems to me conclusive evi-

[1] *The American Journal of the Med. Sci.*, for Jan., 1882.
[2] Gräfe u. Sämisch, B. ii.
[3] Streatfield, *R. L. O. H. R.*, vol. v., p. 79.
[4] Talko, *Zehender's Monatsbl.*, 1870, p. 165.
[5] Reich, *ib.*, 1872, p. 56.
[6] De Wecker, *ib.*, 1872, p. 176. The detailed account of this case is to be found in the *Traité des maladies du fond de l' œil, et atlas d' ophthalmoscopie*, Paris, 1870, p. 207.

dence against rupture of the choroid. So far as I have been able to consult the literature of the subject, no traumatic rupture of the choroid has ever been circular, and both in this and in the atrophy after choroiditis there is more or less massing of pigment at the edges. I am therefore forced to believe that it is congenital and due to arrested development.

The fact that there was no defect in vision or of color-perception at the location of the coloboma would seem to prove conclusively that the layer of pigment cells is not essential to either function.

In a reference to the report of the University eye clinic of Modena,[1] in Hirschberg's *Centralblat.* for 1879, p. 15, it is stated that observations as to the presence of the visual purple at the locality of the defect in coloboma of the choroid, were not successful as to its demonstration; a proof that in man, as in some other animals, the purple is not essential for vision, and possibly takes but little if any part in it.

[1] Ann. d' Ott, 1878, Fasc. 2 and 3, pp. 286-375.

A CASE OF CONGENITAL IRIDEREMIA.

By H. B. YOUNG, M.D. Burlington, Iowa.

THE statement made by Prof. C. Schweigger in his "Hand-book of Ophthalmology," that "irideremia occurs very rarely as a congenital defect either with or without other congenital anomalies," leads me to report the following case:

Willie B., æt. nine years (German parents), anæmic, small, and poorly nourished, was brought to me by his mother, because she "thought he was very short-sighted and had no pupil." Inspection at once showed absence of the iris in both eyes (unless a short strip of color less than 1 *mm.* in width at the lower corneal margin might be called a rudimentary iris), and horizontal nystagmus. With the ophthalmoscope the lenses could be seen in their entirety. Both were in proper position, and both were clear centrally and at the extreme periphery—the middle ground in both being occupied by a ring of fringe-like opacity. Of the fundus, only an imperfect view was had. This was due to several causes. In addition to the nystagmus and lens opacity the child was excited and restless, and the mother in a hurry to be gone, so that what was done must be done quickly. The little that was seen, however, showed nothing unusual. Hypermetropia was present, and estimated at 4 D. V = counting fingers at ten feet, and was improved by the use of the proper convex lenses to about $\frac{10}{100}$. There is no such defect known in any other member of the family in this or past generations. The mother accounts for it (to her own satisfaction) on the ground of a "great trouble" which she had in the third month of her pregnancy, and over which she wept much.

AMYLOID DEGENERATION OF THE EYELIDS.

By Prof. E. RÄHLMANN, M.D., of Dorpat, Russia.

(*With plate* vi, *figs.* 1–6.)

Translated by H. Knapp.

PARTICIPATION OF TISSUE ELEMENTS.

THE first appearance of the amyloid degeneration must, it seems, generally be placed in the deeper strata of the conjunctiva, where, at least in the majority of the cases examined, I have found the highest degrees of this degeneration. From there the degeneration seems to advance on the one hand toward the epithelium, on the other toward the tarsus. New investigations, however, have convinced me that all the layers of the lid, not excluding the epithelium, muscles, and glands, may be involved in this morbid process. As evidence of this, I may mention a case, in which from an otherwise healthy eye, an amyloid tumor, scarcely the size of a bean, was removed, which penetrated the whole thickness of the lid, and was embedded like a chalazeon,[1] between the skin and conjunctiva, in such a way that it originated in the conjunctiva with a small basis scarcely 3 or 4 *mm.* in diameter. Its origin at the inner surface of the conjunctiva tarsi was indicated by a discolored spot without a trace of thickening or congestion of the surrounding tissue. The whole tumor consisted of cells which had undergone amyloid degeneration, of sclerosed connective

[1] Recently I had an opportunity to demonstrate traces of amyloid degeneration in several cases of chalazeon, the tissue of which had been hardened in alcohol. I shall describe this condition at another place.

tissue bundles, of greatly degenerated clusters of glands, and muscular fibres. The case has been cursorily described in the annual report of the Dorpat Ophthalmic Hospital, 1881, p. 56.

Regarding the degeneration of the conjunctiva proper, there is, as I have before pointed out (these ARCHIVES, vol. x, p. 138), a thick subepithelial stratum of adenoid tissue, whose stroma is abundantly supplied with cells, which, especially in the deeper layers, are unusually large, pale, lustrous and, in some places, glassy and transparent. Whenever this tissue layer is affected with true amyloid degeneration (which is the rule), or when it alone is the seat of the degeneration, the cells, the lymphoid bodies situated in the meshes of the stroma, play a prominent part in the morbid process. The degeneration is either first recognizable in these cells, as fig. 1 of plate vi illustrates, or they participate early in the degeneration if the latter originates in the blood-vessels, which according to my experience is quite rare.

While Wagner,[1] Heschl,[2] Tiessen,[3] Koester,[4] Schüppel,[5] and others state that the true amyloid degeneration of the liver originates in the blood-vessels, and assert that the parenchyma cells are destroyed by pressure atrophy without previously degenerating, other authors, Billroth, Friedreich, and others admit a degeneration of the hepatic cells besides a degeneration of the vessels. According to Eberth the degeneration originates exclusively in the connective tissue, and never affects the lymphoid cells (*Zur Amyloidfrage*, *Virchow's Archiv*, vol. xxiv, p. 111.).

On histological examination of the first stages of degenerated conjunctival tissue, we are readily convinced of the fact that the lymphoid cells play a prominent part in the true degeneration, or are even alone affected. We notice

[1] E. Wagner, Beiträge zur Kenntniss der Speckkrankheit, insbesondere der Speckleber. *Arch. d. Heilk.*, Bd. ii, 1861.

[2] Heschl, über d. Amyloiddeg. der Leber. *Sitzungsberichte d. K. Akademie d. Wissenschaften*, iii. Abth., Bd. lxxiv, 1876.

[3] Tiessen, *Arch. d. Heilk.*, 1872, Bd. xviii, pag. 545.

[4] Dissertationen v. Sechtem, Schütte. Bonn 1875 und 1877.

[5] Schüppel, amyloide Entartung der Leber. *Ziemssen's Handbuch der Pathol. und Therapie*, Bd. viii, ii, pag. 359.

(comp. fig. 1) that only the lymphoid cells embedded in the meshes of the adenoid tissue are tinted blue by sulphuric acid, whereas the true stroma cells situated in the nodal points are distinguished by their yellowish color. We must, of course, not examine such cases in which the degeneration is far advanced, and in which every vestige of normal tissue is destroyed. It is, however, not difficult to detect the primary conditions of the conjunctival degeneration, and to recognize the nature of this process, as I have before (*loc. cit.*) pointed out.

"Who has ever seen the first traces of amyloid in the lymphoid bodies?" asks Eberth (*loc. cit.*, p. 112). Pictures like our fig. 1 might fully convince this author. "If the lymphoid corpuscles degenerated they would be recognizable in the meshes of the unchanged stroma," says Eberth, further; and, indeed, we can convince ourselves that in many cases of fresh conjunctival specimens the reticulum is intact (fig. 1), but the exclusively degenerated cells can be recognized by their exquisitely brownish-green or purely blue coloration after iodine and sulphuric acid have been added. It is true that my investigations refer only to the degeneration of the conjunctiva or the lid; I have no experience as to the conditions of the amyloid liver and spleen, but the assertions of Eberth are of a general nature, and formulated as follows: "Neither the direct derivatives of the epiblast, nor of the hypoblast, not even those of the mesoblast, are subject to amyloid degeneration, but solely the connective tissue."

In my opinion, the conjunctiva is the most appropriate place to arrive at final conclusions concerning the pros and cons of the discussion. Its structure is comparatively simple and homogeneous. In some cases, as is illustrated by fig. 1, Virchow's test is exclusively confined to the lymphoid cells. One such preparation would be sufficient to decide the above question. In some of the otherwise homogenous cells the nucleus is still recognizable, and the different stages of degeneration are observed near one another: at *a* hyaline cell-bodies not reacting on ISO_3, and still showing the faint outlines of nuclei; at *b* bluish cells having

undergone slight amyloid degeneration; at *c* greatly degenerated single and aggregated cells, stained deep-blue by ISO_3, in part coalesced so as to form misshapen masses. The pathogenesis of these masses is evident, as the confluence of the degenerated lymphoid bodies can, to a certain extent, even be directly observed. Vermiform figures (fig. 2, *b*) formed by juxtaposition of several cells, are almost invariably seen, but besides them the most varied configurations of the well-known lumpy masses are brought about by the coalescence of several of these formations (fig. 2, *a*).

Certain cases, in which the subepithelial adenoid tissue is degenerating, show strings of cell-bodies (figs. 3 and 4), some of which seem, on the cut surface, to form regular figures. While these strings and cell-chains are stained brown-green by ISO_3, the adjacent cells remain uniformly homogeneous and transparent, thoroughly hyaline, unstained or only slightly brown-yellow. In such cases we have before our eyes the different degrees of the degeneration at the same time, the hyaline and amyloid degenerations in different stages of development.

In order to obtain instructive preparations which show the just-described conditions, it is desirable, as Kyber has pointed out, to expose the microscopic sections only momentarily to a weak solution of iodine, and after that to a greatly diluted solution of ISO_3, likewise only momentarily. This produces a moderate staining, acting, of course, chiefly on the most degenerated parts of tissue, admitting of a nice discrimination of the different elements in the section. These methods can, if necessary, be supplemented by deeper stainings.

In the hepatic cells, according to several authors (Kyber, Böttcher), the formation of amyloid begins in the shape of minute granules. Leber (*Graefe's Archiv*, vol. xxv, 1, p. 296) states that the same process takes places in endotheloid cells of the conjunctiva, but he denies its occurrence in the hepatic cells.

If in the foregoing I have located the beginning of amyloid degeneration chiefly into the cells of the adenoid tissue of the conjunctiva, I have not excluded its primary oc-

currence in the subconjunctival fibrous tissue, or even, as mentioned above, in the deeper parts of the lid.

In most of the cases I have found the epithelium completely intact; in several instances, however, I have not only noticed a hyaline, lustrous condition of isolated groups of epithelial cells, but obtained from them positive results by Virchow's test.

I am, therefore, directly opposed to the views of Eberth, but if I had not perfectly satisfied myself of the possibility of the degeneration of the epithelium, the fact that glandular epithelium frequently shows the ISO_3 reaction would have forced me to differ from that author. The walls and the epithelial lining of the glandular tubes of the conjunctiva are frequently colored intensely blue by ISO_3. In advanced cases I have also found the acini of the Meibomian glands in the interior of the tarsus completely degenerated. The typical location of these glands makes the recognition of the blue stains in their walls, surrounding characteristic calibres, free from error even in those cases where the degeneration has greatly effaced the picture of the normal tissue-elements.

The smaller as well as the larger blood-vessels are frequently found intact even in advanced cases. It is sure that in the conjunctiva at least, the degeneration does not, in all cases, start from the vessels, as Wagner, Heschl, Köster and Schüppel, and I in several cases also, have found. The walls of the vessels are frequently enough found diseased, but they show minor changes than the other parts of tissue. In some specimens the thickened and hyaline vascular walls appear shining yellow, strongly contrasting with the other more degenerated tissue-elements which by ISO_3 are stained deeply blue.

If the vessels are affected they may present all phases of the degeneration. Compare my paper on the Hyaline and Amyloid Degeneration of the Conjunctiva, *Virch. Arch.*, vol. lxxxvii, p. 325, etc. While the capillaries and smaller vessels show no peculiar stratification in the products of degeneration, transverse sections of the larger arteries exhibit all the stages of the degeneration. The adventitia is usually

less advanced in the process of degeneration than the media. In fig. 6 of our plate vi, the muscular coat, *b*, is dirty blue, the intima and adventitia are mahogany, the color produced by ISO_3 in tissue yet little advanced in the degenerative process. The walls of the vessel are greatly thickened and their calibres almost totally abolished.

The degeneration of the middle coat leads to the inference that the smooth muscular fibres early undergo degeneration. The striped muscular fibres, however, soon follow. The fibres of the orbicular muscle are usually affected before the tough connective-tissue fibres of the tarsus. The primary stage of the hyaline as well as of the amyloid degeneration is frequently limited to circumscribed places in the continuity of the muscular fibre. The fibre at these points shows distinct nodular swellings, appears varicose, and loses the appearance of striation. The nodules at first look glassy, later they show the amyloid reaction. The picture of the hyaline degeneration of the muscular fibres of the orbicularis is identical to that which in amputation stumps, in the muscles of typhoid-fever patients, etc., has frequently been noticed and described under the name of lardaceous degeneration. The difference in our cases lies in the fact that the hyaline degeneration is not limited to the muscular fibre, but occurs also in other parts, cells and connective tissues; moreover, in the fact that these hyaline-degenerated muscular fibres are stained mahogany-brown, and occasionally green-brown by ISO_3.

I have not been able to find any statement in literature whether Virchow's test has been tried on hyaline muscular fibres. According to my views to consider the amyloid degeneration as a purely local tissue-change, occurring accidentally without any dyscrasia, a perfect analogy is certainly possible.

The deeper, so-called subconjunctival, tissue, which is directly adjacent to the tarsus, is frequently the principal seat of the whole affection as has been mentioned above. In such instances sclerosis of the connective-tissue fibre-bundles plays a great part, probably preceding in some cases the true degeneration of the fibrous connective tissue. I

have at least long been cognizant of the difference between two types of the degeneration.

DIFFERENT KINDS OF THE DEGENERATION.

In one class of cases the swelling of the lid is comparatively insignificant, but the degeneration unusually pronounced, almost all parts of the lid reacting regularly and intensely on ISO_3, though they have preserved more or less their normal characteristic shape. The hyaline degeneration is little advanced; the albumen of the tissue rapidly becomes amyloid; the structure is preserved. Formation of larger masses and decay are seen only in later stages. These are the cases in which a solution of iodine in iodide of potassium colors large portions of tissue dark brown-green, and ISO_3 colors them intensely blue. The moderately swollen tissue is hard and fragile. The fracture-surface is uneven. The prominent granules on it, even macroscopically, but especially on using a magnifier, appear like fish spawn or boiled sago.

In a second class of cases the swelling of the tissues is much more extensive. The hyaline degeneration precedes a long time the amyloid, as proved by Virchow's test. The intumescences have the appearance of lymphoid tumors. The swelling of the parts chiefly results from a proliferation of the conjunctival adenoid tissue. Besides these changes the deep and even the tarsal connective tissue is markedly sclerosed. Cell nuclei are distinctly recognizable in the surroundings of the enlarged connective-tissue fascicles, the fibrillation of which gradually fades away, so that the cross-sections appear homogeneous even under high magnifying powers.

In fresh unstained preparations large areas of the background are beset with round or oval light patches nicely surrounded by a net of unenlarged nuclei. Carmine colors the patches slightly light red, and the intensely stained nuclei are very conspicuous. Later the sclerosed fascicles are glassy light, hyaline, and imbibe the coloring substance less.

The nuclei of the hypertrophied connective tissue show,

in some instances, changes that can be compared with the sclerosis of the connective-tissue fibre. In this particular my views coincide with those of Leber, who compares the formation of amyloid to the sclerosis of the connective tissue. The granulated appearance on slightly magnified specimens, resulting from lymphoid cells scattered through the stroma of the conjunctiva, is lost; the cells coalesce; the tissue in large areas of the microscopic field assumes stiff forms, as if impregnated with hardened wax. The framework of the conjunctiva with cells in its nodal points remains preserved as long as the cases are not too far advanced in the process of degeneration. (Fig. 2, *c*.)

The tissue thus changed becomes more diaphanous, and some islets in its interior accept Virchow's reagent, while the rest remains unstained. In advanced cases as long as the tissue is not decayed, the stroma is frequently free from the degeneration. In brushed specimens (fig. 5) from which the hyaline and amyloid cell-clusters have fallen out, the presence of an intact though thickened stroma is unmistakable.

Iodine solution alone stains this tissue mahogany-brown. The coloration by ISO_3 is in most of these cases not purely blue, but dull blue-green or green-violet.

The voluminous lid or the conjunctival tumors in such cases have no very hard, but an elastic, resistant feel. The cut surface has no granular, but a tough, lardaceous consistence.

ON THE IMBIBITION OF THE AMYLOID SUBSTANCE, AND THE GENESIS OF THE LUMPY MASSES.

Most authors consider amyloid to be a solid substance which either originates as such in the tissues (Cohnheim, Leber), or is there deposited from the blood-vessels (Rindfleisch, Tiessen, Köster, Schütte). Some authors, however, specially mention its property of imbibition; for instance, Perls (Lehrbuch der allgemeinen Pathologie, 1877, p. 185, etc.) thinks that amyloid degeneration is connected with swelling by imbibition, resulting from some alteration of the circulating fluids. Eberth (*l. c.*, p. 112) states that the whole process, from insignificant imbibition to the formation

of lumpy masses, has frequently enough been studied. Imbibition has so decided an influence on the formed elements of the amyloid substances, that the discussion on the participation of different kinds of tissue in the process of degeneration will reflect the views which each author holds on its nature. It is evident that correct opinions can only be gained from initial stages of the disease, *i. e.*, from studying the progress of the morbid process by periodic excisions of diseased parts. For this reason no organ offers more favorable conditions of observation than the free and directly visible conjunctiva.

Initial stages of the disease, as illustrated in figs. 1, 2, and 3, throw sufficient light on the significance of imbibition as to the formation of the shapeless masses (Schollen). Thin sections of specimens hardened in alcohol very distinctly exhibit the characteristic forms of the adenoid tissue underneath the conjunctival epithelium. If specimen is quickly exposed first to the influence of an iodine-iodide of potassium solution, and then momentarily to that of an ISO_3 solution, and without delay looked at through the microscope; or, still better, if during the observation of the miscroscopic specimen the reagents are added according to the manner described by Kyber, we recognize, while the cells assume a blue color, the nuclei, the cell contours, and the normal intercellular framework, with the tissue cells in its nodal points. The outlines gradually disappear; the blue cell-bodies bulge, touch one another, and coalesce; and the true shapeless masses are ready. In this stage the original forms of tissue can be approximately restored by the action of a weak solution of tannic acid. The nodular (varicose) intumescence of the sclerosed connective-tissue and muscular fibres, as described above, indicates local imbibition of the tissues. Acetic acid does not seem to greatly favor this imbibition, for I have never been able to notice a definite influence of this reagent on amyloid tissue.

As it is commonly supposed that a substance which is capable of swelling by imbibition is also in a certain degree soluble, and as I have demonstrated (*Virchow's Archiv*, Bd. lxxxvii, p. 325, etc.) that the absorbability of amyloid in the

organism cannot be doubted, I have finely powdered a quantity of exquisitely amyloid-degenerated tissue, after it was hardened in alcohol, and have treated it with distilled water for a long time. The liquid, passed through a filter, looked somewhat turbid, and showed a weak reaction of albumen, but not of amyloid. It seems that an albuminous body, after enormous swelling by imbibition, passed through the filter. This seems to indicate that in the degenerated tissue, besides the amyloid a greatly swollen body (perhaps mucin) is present, which gives the first impulse to the formation of substances showing a positive ISO_3 test.

Explanation of the Figures of Plate vi.

Fig. 1.—Amyloid degeneration of the subconjunctival tissue, treated with ISO_3. *a.* Hyaline-degenerated cells. *b.* First appearance of amyloid, characterized by a slightly blue color. *c.* Very pronounced amyloid degeneration of coalesced groups of cells. (Hartnack syst., 7 ; eye-piece, 4 ; tube not drawn out.)

Fig. 2.—*a.* Coalesced shapeless groups of cells, hyaline-degenerated. *b.* Utricular masses formed by juxtaposition of degenerated cells. *c.* Remnants of stroma with nuclei.

Fig. 3.—Incipient amyloid degeneration. Formation of cell-strings by juxtaposition. The specimen has been treated with ISO_3. Staining partly brown, partly green-violet.

Fig. 4.—Advanced stages of the same changes. (Hartnack syst., 7 ; eye-piece, 4. The outlines traced by means of the camera lucida.)

Fig. 5.—Shaken specimen of tissue having undergone marked amyloid degeneration. Stroma from which the amyloid masses have fallen out. (Hartnack syst., 7 ; eye-piece, 4.)

Fig. 6.—Transverse section of an artery, treated with ISO_3, showing various stages of amyloid degeneration side by side. *a.* Inner coat, stained brown. *b.* Middle coat, blue-green. *c.* Outer coat, brown. (Hartnack syst., 7 ; eye-piece, 4 ; tube drawn.)

DORPAT, Jan., 1882.

THE BLOOD CIRCULATION IN THE REGION OF THE YELLOW SPOT.

By WILLIAM C. AYRES, M.D., New York.

(*With a wood-cut.*)

HAVING tried over and over again to get at the exact anatomy of the distribution of the blood-vessels around the macula lutea and fovea centralis, by making injections, rendering the retina transparent with oil of cloves, and examining flat preparations with the microscope, I came to the conclusion that the method was inseparable from so large a factor of chance that entoptic observations were much more satisfactory. I have, therefore, devoted much time and pains to them.

As nature furnishes a better injection of small capillaries in the living state than we can ever hope to reproduce artificially, and since certain precautions in experimentation render observation on the living blood-supply so easy, we obtain a far better idea of the true state of things in the living retina than from the best-injected specimens hitherto produced.

There are many ways of demonstrating the retinal vessels entoptically which have been long known, but I have found others which are perhaps interesting enough to deserve publication.

The first way in which it can be done was furnished by Purkinje, which consists in concentrating light on the sclera in a dark room. The explanation of why we see the retinal vessels in this experiment is easy. The second was more

fully described by H. Müller. The third is by placing a diaphragm with a small hole in it in front of the eye, and moving it while the eye is directed toward a clouded sky. The fourth is by looking through a microscope and either moving the instrument or the head rapidly through small excursions.

The first of these methods differs from the rest in the fact that the light is made to pass into the eye through the sclera or in an unnatural way. In the others the light passes through the pupil as usual. But the explanation of why the retinal shadows become perceptible is essentially the same in all.

Helmholtz, in his book on physiological optics, explains the result of the experiment of looking through a small hole, in the following manner: He says the reason why we do not see the vessels in our own eye under ordinary sizes of the pupil, and the reason why we see them when we look through a hole that makes the beam of light entering the eye smaller than it is when it passes through the pupil, depends upon the difference in the distinctness and length of the shadows of the blood-vessels when the beam of light is large or small. According to him, under the usual conditions the shadows must be broad, indistinct, and short, whereas the central shadow cone in a narrow pupil is very much the contrary. He also states at some length that when the pupil is wide the length of the shadow cone is not sufficient for its apex to reach the percipient elements of the retina. The shadows can be only 4–5 times as long as the width of the vessel casting them, and since, according to E. H. Weber, the thickest branch of central vein is only 0.038 *mm.*, and according to Kölliker the retina is 0.22 *mm.* thick in the background of the eye, the apex of the shadow cone would not reach the layer of rods and cones, but would fall somewhere else in the tissue of the retina. When the beam of light entering the eye is smaller, the shadows will be narrower but more distinct and longer; in this way they become long enough to reach that part of the retina which can take cognizance of their existence.

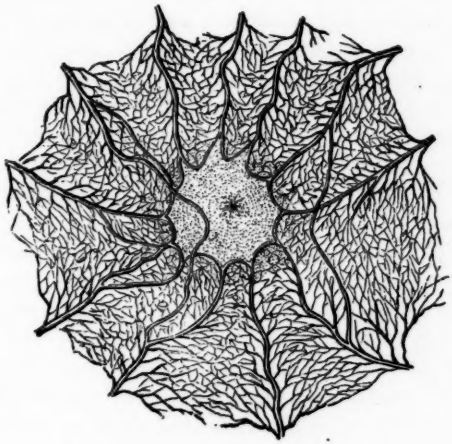
This explanation is quite ingenious, but at the same time,

if I understand it well, it is unsatisfactory, since the success of the experiment is entirely independent of the size of the pupil, or the beam of light entering the eye. In fact, if we put homatropine in one eye, the wider the pupil dilates the more distinct the vessels become, provided we have some way of throwing the shadows into positions on the retina in which they are not accustomed to fall in any given direction of the optical axis.

There are other ways of rendering the vessels in one's own eye apparent, in which the size of the pupil is not interfered with. For instance, if we hold a solid body with sharply defined edges close to the eye and oscillate it, when the edge of the body comes opposite the edge of the pupil the vessels will appear, if we look toward any luminous object. The body need not cover any part of the pupillary space, but if it does, the vessels still remain distinct. In the same way, if the solid body is held between the eye and a distant light, the edge of the light nearest to the solid body will be colored red, and the edge away from it blue or violet. This shows that there is a series of refractions produced which overlap each other in such a way that all color is done away with, except the extreme red end of the least refracted, and the violet end of the most refracted, spectrum. In this way the light which passes the edge of the solid body on its way toward the retina, is bent so as to fall on a part of the retina upon which it is not accustomed to fall. This experiment is peculiar, since neither the head nor the source of light has to be moved.

The most beautiful way of all, and in fact the easiest, to show the retinal blood-vessels is to put homatropia into the eye, then stand with the back to a common gas flame, and so adjust a plain gold ring close to the cornea that its convex surface will throw a *blurred* image of the light into the eye. The slightest movement of the ring will cause every capillary around the macula lutea to be seen with the greatest distinctness. Since the surface of the ring is rather small, if we obtain an ordinary teaspoon and place it near the cornea, either with the concave or convex surface toward the light, the extent of area over which the vessels become

visible is much greater, and the individual vessels are just as distinct. It makes no difference in this experiment whether the spoon or the head be moved, since in either case the shadows will fall on the retina in places where they are not accustomed to fall. The experiment is not very trying on the eye. Either the spoon or the head must remain stationary while the other is moved. If we open the other eye and look toward a piece of paper, the vessels will be seen as if projected on the paper, where they can be traced as with a drawing prism. It can, however, not be done with perfect exactness, for the motion which is necessary to make the vessels appear causes them to move on the paper, as can be easily explained. I have endeavored to reproduce the vessels in the retina of my left eye in this way. (See drawing.) Whereas the drawing is not exact, it has a great de-



gree of proximity to the true condition of the retinal circulation around my macula lutea. There are peculiarities in it which I would hardly think constant; for instance, the large vessel which runs across the macula lutea to the left. This vessel is so large that Dr. Knapp could see it with the ophthalmoscope on examining my eye with that instrument. I could not distinguish which were arteries and which were

veins, but seven large vessels came from above, and five from below, making twelve in all. The above-described particular movement I tried to make circular, so that all of the blood-channels would appear, but I find that by a vertical movement other vessels occur which are not in the plate. When the motion is only horizontal the vertical vessels are of course seen plainest; and when vertical, the horizontal ones come out more distinctly.

The vessels are more rapidly reduced in size as they near the macula lutea than they appear in the drawing. I have drawn them a little larger, so as to show the peculiar *anastomosing capillary corona* which surrounds the macula. It consists of a series of loops. There are also large vessels in the vicinity which do not run to the macula but pass by to the sides. These I have not represented. The central clear space is about as large as my macula lutea appears. In it are innumerable dots which must be either the retinal granules or the bulbs of the cones. They are arranged more or less radially around the fovea centralis. The fovea itself does not seem to be in the centre of the macula, but in the projected image a little upward and inward, or in the eye downward and outward.

If the light be not too bright and the motion of the ring, or rather the spoon, be very rapid, the motion of the blood-currents in the capillaries is also seen, but not *very* distinctly.

Homatropia is not essential to the success of the experiment, but it gives a greater area over which the vessels are seen, and also the whole picture is much more distinct.

If any one who has never had a good view of the circulation of his own eye will repeat the little experiment, I am sure he will be delighted with the ease with which he can do it, and with the beauty of the picture, which he cannot fail to see.

There is still another way of rendering the retinal vessels apparent, which has the peculiarity of not requiring any motion either of the source of light or of the eye, viz.: Place a solid body, like the finger, close to the cornea, and look toward the light. The vessels will be seen on account

of the deflection of the rays entering the eye. The vessels appear without any vibration of the finger. If we then remove the finger, the vessels become distinct, with the difference that before they were dark shadows, whereas after they are light streaks.

There are again other methods, such as letting the light be reflected from the cornea of some one else and fall into your own eye, the two eyes being very close together. If either the eye assisting in the experiment or your own eye be moved, the retinal vessels come nicely into view.

Also, if in smoking a cigar in the dark, we blow off the ashes, so as to render the lit end bright, and place it close to the eye and oscillate it, the blood-vessels will be seen quite nicely.

There are many details concerning the rapidity of the blood-currents in the retina depending upon their distance from the macula lutea which I reserve for a future contribution, since I have found quite a convenient method of recording the velocity of the blood in the retinal vessels.

REPORT ON THE 14th MEETING OF THE OPHTHALMOLOGICAL SOCIETY AT HEIDELBERG, SEPT. 14–16.

By Dr. A. NIEDEN, Bochum.

Translated by Dr. F. E. D'Oench and Others.

The meeting, which was well attended, especially by the younger members, was called to order by Prof. v. Arlt, who reported that the judges chosen to award the v. Wells prize for the best paper which had appeared in *v. Graefe's Archives* during the last three years, could not yet give their decision. The meeting expressed the desire that the judges (who were present) would consult, and that their vote should then be final.

Prof. Becker was elected president and proceeded to the order of business. Nieden read a paper on recurrent idiopathic hemorrages into the vitreous in young men. He concurs with v. Graefe, Eales, Hutchinson, and Schweigger, in considering it a rare affection, as he saw it but nine times in young men from fifteen to twenty-four years among 35,000 cases. The sudden complete obstruction of the field of vision is characteristic, which is due to a diffuse darkening of the vitreous humor by hemorrhages, sometimes in its anterior, sometimes in its posterior portion; their cause cannot be traced; they are not due to a diseased condition of the blood-vessels (albuminuria, diabetes, syphilis, gout, hæmophilia, etc.), they are rapidly absorbed, but are soon followed by similar attacks. As many as seven relapses were observed in one year, which sometimes affected the one eye, sometimes the other; of the nine eyes the right being affected five times, and four times the left. The final result was generally favorable: complete restitution of the central power of vision, slight peripheric defects; only once, after three relapses, the globe remained so distended,

that the emmetropic eye was converted into a myopic one of 6 D. After absorption the hemorrhage was found to have proceeded from the equatorial region of the fundus, where irregular, disseminated patches, lined with pigment, were visible, over which the blood-vessels passed in normal manner. Judging from the sudden development and extent of the hemorrhage, and the choroidal changes just mentioned, it is probable that the hemorrhages are due to a bursting of choroidal blood-vessels in the region of the equator, which also ruptured the retina. Their cause may be sought in the irritation of the blood-vessels, due to the sexual development, and may thus be explained in the same way as epistaxis at the age of puberty. Good results were obtained by giving hydr. biniod. rubr., and potass. iodid.

The paper was discussed by SCHWEIGGER, who called attention to similar cases in women ; and LAQUEUR, who pointed out the development of myopia as the result of distension of the envelopes of the globe.

Prof. LEBER spoke on the genesis of detachment of the retina. He spoke of the theories now held, and showed the untenability of some of them for the usual form of detachment ; for instance, of the theory based on pressure from behind, or on cicatricial contraction of the choroid, or on distension of the envelopes of the globe. Relying upon his experiments in regard to the introduction of foreign bodies into the interior of the globe, Leber frequently observed a few days later extensive detachment and rupture of the retina, which, of course, was not directly due to the injury in question. When unoxidizable or hard-oxidizable substances were introduced, like glass, gold, etc., detachment did not ensue, but it always followed the introduction of easily oxidizable metals on account of the structural changes produced by them in the vitreous. The injection of certain chemical substances produced similar results. Perforation of the retina was always the first symptom of detachment, so that to it may be traced the ensuing detachment, as it permits the vitreous to penetrate behind the retina. In most of the recent cases observed in which the detachment had rapidly developed, a similar condition was found, as in eleven out of fifteen cases the perforation could still be easily recognized, and in three only could not be traced. Out of twenty-seven cases of chronic detachment the perforation was still visible in fourteen, in five it was doubtful, and in eight the investigation failed.

V. GRAEFE has called attention to the existence of a perforation; v. WECKER shares the same opinion; LEBER has demonstrated its existence as a rule. The rupture of the retina is therefore due to traction from within, as is apparent from its ragged appearance, the presentation of the base toward the periphery, and the inward turn of the ragged edges.

The retraction is due to structural changes in the retina, as is apparent from the fibrillous character of some of the fascicles, the agglutination between the vitreous body and retina, which frequently shows hypertrophy of the supporting tissue, etc. Both the vitreous and retina remain transparent, so that frequently this change cannot be seen with the ophthalmoscope. By thus assuming that the vitreous penetrates behind the retina, the chemical similarity of the liquid before and behind the retina, which has frequently been proven in detachment, is explained.

If this explanation is correct, the attempt to remove the subretinal liquid by a cut or paracentesis must fail; perhaps an extensive equatorial incision might counteract the traction from within, and thus effect a cure.

In the discussion which followed, SCHWEIGGER pointed out that he too had not infrequently seen ruptures of the retina in recent and extensive cases of detachment, and had called attention to this in his text-book. V. ARLT is opposed to the use of the term "solutio," which he does not consider appropriate, and would like to substitute "secessio" for it. SAMELSOHN defends the mechanical theory. BECKER and ARLT report cases of sudden detachment in older persons after a hot bath.

Prof. SATTLER spoke of his continued investigations upon the development of trachoma owing to micrococci, as already reported at the previous Congress, and now revised in accordance with the new methods of Koch. The results of breeding and vaccination were with this method also of the same positive character, so that these latest experiments directly confirm the results of last year. The details of the method of breeding were described. It is characteristic of these round micrococci that they never assume the zoöglœa type, but always appear singly or in pairs, the latter also separated by a small interstice. One of the principal characteristics also is the extensive subdivision of the nuclei of the trachoma granule. The result of vaccination of animals was very favorable. The third generation also, when transferred to the human conjunctiva, gave rise to a trachomatous

eruption, taking a slow and mild course. The micrococci of trachoma only produce similar formations upon the conjunctiva, while inoculation with other fluids containing numerous micro-organisms, for instance, decomposing blood, lochial secretion, gonorrhoic pus, etc., failed to produce trachoma granules. Probably the micrococcus of blenorrhœa neonat. is one disseminated in the air. As for the therapeutics, the antiseptic treatment would seem the most rational. The solution of sublimate, however, which was praised so highly, did not prove so successful in the treatment of trachoma as in that of gonorrhœa, although it reduced the secretion.

Discussion.—BAUMEISTER, like KERSCHBAUMER, is in favor of the use of iodoform in cases of infectious conjunctivitis and keratitis. SAMELSOHN reports a case of tubercle bacilli, in a case of tuberculosis of the iris. LEBER constantly found micrococci in fresh cases of hypopyon keratitis, and in acute panophthalmitis of traumatic origin in the vitreous, though suppuration had not yet begun.

UHTHOFF reported his observations on the pathological anatomy of episcleritis and spring catarrh, the specimens of which were obtained by the operative removal of the nodules combined with scarification of the subconjunctival tissue, the method described by SCHÖLER, or by direct abscission of the hyperplastic conjunctival margin of the cornea. In the specimens of episcleritis the blood-vessels were found widely distended, the immediate surroundings of their sheaths strongly impregnated with round cells, the subepithelial tissue of the conjunctiva infiltrated, and here and there exudations containing numerous cells. The lymph-vessels also were considerably distended, and in one place had developed into a system of cavernous lacunæ. The endothelium was frequently destroyed. The specimen of spring catarrh was obtained from a young man of twenty, who had suffered since he was twelve years old from eczema of the knee and elbow, which for five years had regularly returned every summer. After that he suffered for six years from bilateral typical spring catarrh. The excrescences of the limbus were abscised, when the epithelium was found considerably thickened and extending inward like in cancer. There was, however, no arrangement in layers. Below the epithelium there was a homogeneous layer, without nuclei or cells, frequently assuming the form of nests. The stroma itself was but slightly altered.

In the afternoon session, Prof. v. ROTHMUND presiding, LEBER demonstrated the microscopic specimens illustrating his paper read in the morning, also UHTHOFF.

STORY (Dublin) demonstrated his self-registering perimeter, which, though simpler than that shown by STEVENS at last year's Congress at London, is not well adapted for daily use. He also showed some fine specimens of divided eyeballs embedded in gelatine according to a method of PRIESTLY-SMITH, which seem admirably adapted for macroscopic demonstration.

DÜRR explained his clearly arranged plates, which graphically represent the conditions of refraction and accommodation of both the higher and lower schools of Hanover.

BAUMEISTER showed an ophthalmoscope for the determination of refraction, designed by himself for the use of students, with a disc containing only seven lenses (3+, 4−).

BERLIN demonstrated some fine ophthalmoscopic pictures of the fundus of the horse, representing the normal appearance of the optic nerve, the papilla, and the region of the tapetum. He also explained the construction of a little instrument designed to determine the base line in writing, the description of which is contained in the paper on the hygienic advantages of the oblique system of penmanship.

BECKER spoke of Thomas' curves and the interfibrillous channels of the lens described by him, elucidating his remarks with models and drawings.

Saturday, September 16th.—The meeting was called to order by the chairman of the day, Prof. SCHWEIGGER. HELFREICH spoke of the venous pulse of the retina and intra-ocular circulation, referred to the views accepted at present, but did not consider them sufficient to explain the phenomenon. The important point is that the venous pulse does not coincide with the systole, but with the diastole, of the heart, and secondly, that it is not produced in the eye, but is the result of the circulation of the cranium. The intra-ocular depends directly upon the intracranial circulation. As experiments have shown, the pressure in the veins of the skull is abnormally high and constantly fluctuates with the pulse, immediately following the systole of the heart. These fluctuations become apparent in the venous pulse of the retina, as the vena ophthalmica empties into the cavernous sinus, which is affected by the pulse. The reason why the pulsation is visible only upon the papilla, and not in the retinal veins, must be

ascribed to the anatomical conditions, the veins upon the disc being but loosely attached, while those of the retina are bound down more firmly and cannot therefore dilate to the same extent. Compression of the jugular vein at once stops the venous pulse in the eye. No pulsation is observed in the vorticose veins, on account of the great vascularization, the distension, the more rapid circulation, and the difficulty of interruption in these choroidal vessels, although theoretically the existence of a venous pulse in them must be assumed. As regards the circulation in the ciliary blood-vessels and retinal arteries, no pulsation is visible under normal conditions.

Prof. BERLIN then read a paper on the hygienic advantages of the oblique system of penmanship. The physiological part of the question has been discussed in the last number of *v. Graefe's Archives.* The results are based upon a large number of examinations and measurements of the position of the head and body of school-children when using the vertical as well as the oblique system, and in horizontal position of the book and when tilted toward the left. When the book lies horizontal the child must turn its head toward the right, the spinal column is also turned, and scoliosis is the result. Out of 460 children who were measured, the right eye was found nearer the writing in 4 %, the left in 73 %; in only 23 % both eyes were equally distant. The average distance from the book was 10.5 *cm.*, instead of 25 *cm.*, as it should be. A great strain upon the accommodation thus resulted, about two thirds more than necessary. When the book was then placed obliquely, the distance of the head from it at once increased when the child wrote slantingly. The same was the case with the vertical system. Although the advantages of the two systems in this position are therefore about the same, the oblique, nevertheless, is preferable, as it requires less muscular exertion of the whole arm, the vertical system exercising the arm up to the shoulder.

Discussion.—LAQUEUR favors the oblique system combined with an oblique position of the book, as it throws the work more upon the flexor muscles of the arm, which naturally are the stronger ones. MANZ arrived at the same results; he also thought the form of the German and Latin letters ill adapted to the vertical system. The crooked position of the child is also due to the greater muscular exertion caused by the rigidity of the steel pen; attention should therefore be paid to this point also. PFLÜGER ascribed the near approach to the book to the tendency of the

children to see every thing as large as possible. In opposition to FRÄNKEL, who believes the oblique system to be unphysiological, BERLIN pointed out that the greater rapidity of execution had obtained for it the right of existence in these days when quick work has become a necessity.

HÄNSELL reported his investigations upon the structure of the vitreous body, particularly as regards the origin of the pus-corpuscles in inflammation of the vitreous. He declared in favor of their idiopathic pathogeny. They are derived from the remnants of the cells which still exist as such in the embryo, and the pathological processes in inflammation are exactly analogous to those which can be observed in the physiological development of the embryo.

Prof. ZEHENDER spoke of the danger of peripheric prolapse of iris and its tendency to subsequent acute irido-cyclitis. He ascribed the cause of this generally deleterious process to the constant drag exerted upon the iris by the scar. He is therefore opposed to the abscission of the prolapse, as this only serves to increase the traction. He obtained good results from a small iridectomy performed laterally from the prolapse, which rather resembled an incision into the inner edge of the coloboma, and thus reduced the tension. ARLT referred the cause of this purulent irido-cyclitis principally to mycotic infection, due to superficial loss of epithelium of the projecting prolapse; LEBER, also, who saw recovery in only extremely few cases. In order to facilitate the healing of the wound, it is advisable to abscise the prolapse. BERLIN, MAYWEG, PFLÜGER, and ROTHMUND were partly in favor of iridectomy, abscission, or entire non-interference.

Prof. ARLT briefly described a method of operating for entropium and distichiasis recommended by TAMAMCHEF, which consists in dividing the lids from their margin into an outer and inner portion, and then introducing the nitrate of silver, in order to produce a strong cicatricial tension outward. The result in two cases was favorable.

NIEDEN showed a collection of vulcanite eyes for children and laborers made according to his directions, whose advantages for certain purposes are becoming universally recognized, and declared that they had served him in good stead in the dead-house, in replacing eyes which had been removed for examination. Before the coffin is closed they are removed and kept for further use.

The admission of ten new members was reported, while two had died. The prize of Ritter v. Wells will not be awarded until next year, as the judges were not all present.

In the afternoon session Prof. PFLÜGER spoke of the treatment of glaucoma. The increased tension is not the result, as has heretofore been assumed, but the cause, of the choroidal affection, which always exists. New manometric tests have confirmed the observation already made, that all mydriatics, and also pilocarpine, primarily reduce the tension in the normal eye, while eserine increases it. The opposite effect in glaucoma is due to the pathological changes in the eye, especially the altered position of the iris. Eserine sometimes also acts by its stimulating action upon the nutrition of the eye. Pflüger has seen no permanent cures from sclerotomy ; iridectomy has not been superseded : the former should only be practised when there is suspicion of malignant glaucoma and the eye becomes soft after the escape of the aqueous humor and remains so.

PFLÜGER then reported his experiments on the injection of fluorescine into the optic nerve of the dog, in order to test transmission from one optic nerve to the other. After an injection under the pia or dura mater of one eye, fluorescence of both retinæ at once set in, thus proving the direct connection of both retinæ by means of the optic nerves, and strengthening the theory of transmission of sympathetic irritation through them. In the rabbit, not the retinæ but the choroids showed fluorescence. If the injections under the dura mater are carefully made, the eyes return to their normal condition.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE SECOND QUARTER OF THE YEAR 1882.

By H. MAGNUS, Breslau; C. HORSTMANN, Berlin; and A. NIEDEN, Bochum.

WITH THE COÖPERATION OF

E. Nettleship, London; C. E. Fitzgerald, Dublin; E. Marckwort and P. von Mittelstädt, Antwerp; Dantone, Rome; van der Laan, Lisbon; Hirschmann, Charkow; S. M. Burnett, Washington; Ole Bull and Schiötz, Christiania.

A.—GENERAL OPHTHALMOLOGICAL LITERATURE; GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS; NORMAL ANATOMY AND PHYSIOLOGY.

By H. MAGNUS, M.D.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

a.—TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

1. Beer. Introduction to the higher optics. Revised by Victor v. Lang. Second edition. Braunschweig, 1882, vol. ix, p. 423, 8vo.

2. Bourneville. L'année médicale, 1881. Paris, 1882. E. Plon. The chapter on ophthalmology, written by Poncet, fails to mention where the original articles can be found.

3. Burnett. How we see. Lecture delivered at the National Museum in Washington, April 29, 1882. *Saturday Lectures*, No. 8, Washington, 1882.

4. Caro et Cuomo. Compendium d' ophthalmiatrie pour les étudiants et les médecins practiciens. Naples, 1882.

5. Heller. The history of physics from the time of Aristotle to the present day. Vol. I. From Aristotle to Galilei. Stuttgart, 1882, vol. xii, p. 411.

6. KRENCHEL. *Annual report* on the Scandinavian ophthalmological literature for 1881. *Centralb. f. pract. Augenhk.* Supplement to the report for 1881. Leipzig, 1882. And Krenchel: Om Synspröver for Sömand. *Hospitals-Tidende*, May 24, 1882.

7. MASSELON. Examen fonctionel de l' œil. Paris, 1882. For the use of beginners. Short, but clearly presented. Can be recommended.

8. MARTIN. Des affections oculaires chez les gens de campagne. Paris, 1882.

9. MENGIN. Une visite aux grandes cliniques d' ophthalmologiques de Paris. *Rec. d' ophth.*, June, No. 6. In glaucoma iridectomy is preferable to sclerotomy. Neurotomy is not a rational operation. Reproduction of the debate on antiseptics at London.

10. MOOREN. Five lustra in the practice of ophthalmology. Wiesbaden, 1882, iv, 311, 8vo.

11. NAGEL. Contributions from the ophthalmic clinic at Tübingen, third number. Tübingen, 1882. Contents. Schleich: Clinical statistics on myopia. Weiss: Contributions to the anatomy of the myopic eye. Nagel: Statistical notes from the ophthalmic clinic at Tübingen. The individual articles are reviewed in the various sections of this report.

12. NETTLESHIP. Diseases of the eye. London, 1882. This text-book, now in its second edition, is, for students, undoubtedly one of the best in the English language.

13. v. OETTINGEN. Eye and ear. Lecture delivered Jan. 30, 1882. Dorpat, 1882. Popular comparison between the two senses. Nothing new.

14. PAGENSTECHER. The care of the healthy eye. Annual report for 1881 of the Charitable Ophthalmic Hospital at Wiesbaden. Wiesbaden, 1882. Popular.

15. PONCET. Hygiène des écoles au point de vue de l' organe de la vision. *Rev. clin. ocul.*, No. 4, Apr., 1881.

16. WILLIAMS. Why we have two eyes and two ears. *St. Louis Med. & Surg. Journ.*, vol. xlii, 4.

The first edition of BEER's (1) **introduction to the higher optics** appeared in 1852. Its manifold advantages soon made the book indispensable, so that a second revised edition is very welcome. The great progress of ophthalmology since 1852 is thoroughly considered, while some chapters, for instance the second part which treats of double refraction, have been materially altered. The theory of Cauchy has been supplemented in a manner to bring it into better accord with the facts. The tables containing the coefficients of refraction of singly refracting bodies have been omitted, also those containing the optic constants of crystallized bodies.

BURNETT (3) explains the act of vision in a very ingenious though elementary manner, and with especial regard to the perception of color. He is inclined to consider color-sense as a higher form of development of the nervous functions.

HELLER (5) in his history of physics has given a new impulse to historical investigations in the field of the natural sciences. Of course the subject of optics is only briefly treated in his excellent book, for the whole range of physics

had to be considered. It is sufficient, however, to give a good idea of the development of optics. The investigations of every author upon the subject of optics are accurately stated, and what they have done for the theory of vision.

KRENCHEL (6) reports upon the regulations which have been adopted in Denmark in regard to the examination of applicants for the service in the navy. As a member of the committee which was appointed by the government to supervise these regulations, he sets forth the reasons which induced him to propose the course of procedure which was accepted, and which, in most points, agrees with that adopted by the International Medical Congress at London, in 1882. In some respects, however, it differs. For instance, it was ordained that not hypermetropia of 1 D, but of 2 D, should exclude from active service. A cursory examination of the field of vision is ordered. Colored glasses and lamplight are used for testing color-perception, the results to be verified with Holmgren's method. OLE BULL.

In the course of 25 years MOOREN (10) **has treated 108,416 patients, and performed 17,952 operations** as follows: 2,330 cataract-extractions with scleral section, 542 with corneal section; 368 divisions of cataract; 766 operations for secondary cataract; 6,179 iridectomies; 327 iridotomies; 5,043 tenotomies; 222 advancements; 761 enucleations. The different diseases of the eye treated during this time are arranged in special tables; this statistical material, however, is too extensive for reference, though very instructive; we must be content to call especial attention to this valuable work. Mooren has made his enormous practical experience subservient to the interests of science in the most extensive manner, which he now offers in the work referred to. It need scarcely be mentioned that it contains a large number of the most exact observations and a great variety of practical notes on all chapters of ophthalmology. Mooren's observations are especially valuable, as he always attempts to place them upon a physiological and anatomical basis. The result is that some chapters are of interest not only to the specialist, but also to the general medical public. For instance, the manner in which he explains the action and therapeutical importance of the cutaneous irritants, is of importance not only to the oculist but also to the general practitioner, and well adapted to place this method of treatment, so much maligned, upon a firm scientific basis. The remarks upon the heredity of disease and other subjects are of the same general interest.

b.—STATISTICAL PAPERS.

1. KIPP. Second annual report of the Newark Eye and Ear Infirmary, for 1881. 2,071 eye patients; 359 operations; 14 extractions.

2. Cologne Ophthalmic Hospital for the Poor. *Seventh Annual Report.* Cologne, 1882.

3. NAGEL. Statistics from the ophthalmic clinic at Tübingen. Communications from the ophth. clinic at Tübingen. Number iii, Tübingen, 1882.

4. PAGENSTECHER. Annual report, for 1881, of the Ophth. Hospital for the Poor at Wiesbaden. Wiesbaden, 1882.

5. Presbyterian Eye and Ear Charity Hospital. *Fourth Annual Report*, for the year ending December 1, 1881. Baltimore, 1882.

6. ROSMINI. Rendiconto clinico del' instituto oftalmico di Milano per il quinquennio 1874–78. *Gaz. med.*, No. 14.

7. SELLINGO. Ambulatorio clinico oculistico. Septimo rapporto annuale. Anno, 1881. *Gaz. med. di Roma*, No. 10, Maggio, 1882.

8. SCHLEICH. Clinical statistics on myopia. Communications from the ophthalmic clinic at Tübingen, No. iii, pp. 1–63.

9. SCHMEICHLER. Cataract-extractions at the clinic of v. Arlt. *Wiener med. Wochenschr.*, 1882, No. 15.

10. SMITH. Report of the Eye and Ear Department of St. Mary's Hospital, Detroit, Mich., 1882.

11. STRUWE. First annual report of the Ophthalmic Institute at Gleiwitz, 1880–1. 1,434 patients, 95 operations.

12. WICHERKIEWICZ. Fourth annual report of the Charitable Ophthalmic Hospital in Posen, for the year 1881.

13. Zestiende Verslag van het bestur der vereeniging tot het verleenen van hulp aan minvermogende ooglijders voor Zuid-Holland, gevestigt te Rotterdam, loopende over het jaar 1881. 2,892 patients; 152 operations; 38 extractions.

The ophthalmic clinic at the University of Tübingen (3) was opened in the year 1875, and attended by (?) patients; in 1876, by 778; in 1877, by 980; in 1878, by 1,226; in 1879, by 1,213; in 1880, by 1,471; and in 1881, by 1,679. During this time the following operations were performed: 472 extractions; 124 iridectomies; 9 scleral punctures in detachment of the retina; 66 squint-operations.

In Wiesbaden (4) 1,665 diseases of the eye were treated and 304 operations performed; 18 cataracts were extracted within the capsule, 17 of them with good result; 26 modified linear extractions, all with good result; 55 iridectomies, 22 for optical purposes.

In the Presb. Eye and Ear Hospital (CHISOLM) at Baltimore (5) 2,550 diseases of the eye were treated in the year 1881, as follows: 397 cases of diseases of the lids, 133 of the muscles and nerves, 109 of the lachrymal apparatus, 781 of the conjunctiva, 475 of the cornea and sclera, 221 of the iris, 68 of the choroid (including glaucoma), 105 of the retina and the optic nerve, 24 of the vitreous and anterior chamber, 167 of the lens, 44 of the globe, 310 cases of errors of refraction and acccommodation. 461 operations were performed: 62 extractions, 52 according to von Graefe; 33 iridectomies, 58 operations on the cornea, 82 upon the lids, 32 upon the conjunctiva, 106 squint-operations, 72 upon the lachrymal apparatus. In the last four years there were operated: 218 cataracts, 381 tenotomies, 272 operations upon the lachrymal apparatus, 71 enucleations, 94 iridectomies, 76 removals of pterygium, 377 operations on the lids, 14 optico-ciliary neurotomies.

SELLINGO (7) treated over 63 % of diseases of the conjunctiva and cornea, 7 % errors of refraction and accommodation, 11 extractions with small flap downward; no failure. DANTONE,

SCHLEICH (8) examined in all 578 myopes, of whom 410 belonged to the male and 168 to the female sex, *i. e.*, 70 % men and 29.1 % women. Among the male sex the ages were as follows: 7 up to 10 years old, 137 from 10–20, 134

from 21–30, 39 from 31–40, 40 from 41–50, 26 from 51–60, 24 from 61–70, and 3 over 70. The youngest male myope was 6 years old. Many children under five and newborn children were examined under atropine, but myopia was never found. There was almost always hypermetropia of a low degree; 45.2 % of the women and 30.2 % of the men belonged to the rural population. Anisometropia was frequently observed. High degrees of myopia are much rarer than low ones, though the former are comparatively more frequent among women. The proportion of myopes among the older women is much greater than among the younger. The degree of myopia increases with age. Among 738 myopic eyes, 329, *i. e.*, 44.5 % had normal vision, and 409, *i. e.*, 55 %, $V < 1$. In low degrees of myopia V is about normal, but it decreases as the degree of myopia increases, which is also the case with advancing years. In 87.7 % changes at the papilla are visible with the ophthalmoscope, due to atrophy or displacement of the pigmented epithelium and the choroid. These changes are most frequent at the temporal border of the papilla, and rarest at the upper edge. These alterations are called crescents, and a certain relation exists between their shape and that of the papilla. The extent, size, and kind of the crescent generally bear a certain relation to the age, the state of refraction, the power of vision, and the frequency of complications. The breadth and extent of the crescent increase with age. As the crescent increases, V decreases. In 41 cases, *i. e.*, 7 %, there was concomitant squint; of these 31, — 5.3 %, divergent, and 10, — 1.7 %, convergent squint. In 15 cases of divergent squint there was isometropia, in 14 anisometropia. Latent disturbances of the muscular equilibrium were much more frequent than these manifest forms of squint. The most common form was latent divergence near by. 244 eyes were treated for some length of time with atropine, 173 of which, *i. e.*, 70.1 %, showed a primary reduction of the state of refraction in consequence. 75 eyes could be examined again after some length of time, 25 of which, *i. e.*, 33 %, showed no increase of the primary reduction of the state of refraction. It showed, therefore, that the extensive use of atropine is of the greatest therapeutical importance in progressive myopia. Various complications were found. There were opacities of the cornea and anomalies of its shape, as keratoconus, keratectasia. On the iris were observed iritic remnants, irideremia, coloboma, pupillary membrane. In the lens: tremulousness in 4 cases; in 12, anterior or posterior polar cataract; in 22, zonular cataract. In 75 cases progressive cataract was observed. One of the most frequent complications of myopia is liquefaction and opacities of the vitreous, especially in higher degrees. The most important changes are those in the region of the posterior pole. In 7.4 % of the men and 9 % of the women such complications were observed, consisting in exudation and hemorrhage, or remnants of such processes. Detachment of the retina occurred in 2.6 %. In 2.9 % there were inflammatory affections of the choroid, or residues of such. Albinism and coloboma of the choroid were also observed.

From 1874 to 1881, 1,460 persons with 1,547 senile cataracts were operated at ARLT's (9) clinic by peripheric linear extraction; 1,210 were mature, 232 hypermature, 67 immature, 38 complicated. In 33 cases there was hemorrhage during the operation; in 183 the expulsion of the lens was difficult; in 122 vitreous escaped; 1,277 cases were operated without accident; in 117 cases parts of the lens remained in the eye; in 139 there was iritis, in 22 traumatic keratitis, in

10 panophthalmitis. In 1,138 cases the course of healing was normal. Secondary operations were necessary: in 19 cases iridectomy, in 11 iridotomy, in 84 discission. 1,409 cases were cured, *i. e.*, 91.23 %; 33 were lost, *i. e.*, 2.06 %. A doubtful result with chances of improvement by an after-operation was obtained in 92 cases, or 6.44 %. In the last eight years 39 flap-extractions were performed, with recovery in 74.4 %, loss in 12.8 %, and a doubtful result in 12.8 %. V at time of discharge — $\frac{6}{8}$ in 10 cases, in 22 — $\frac{6}{9}$, in 87 — $\frac{6}{12}$, in 205 — $\frac{6}{18}$, in 305 — $\frac{6}{24}$, in 303 — $\frac{6}{36}$, in 179 — $\frac{6}{60}$; in 96 fingers were counted at 3–6 metres, in 50 only at 1–3 metres.

SMITH (10) reports upon 1,780 cases of eye-diseases and 143 operations: 10 extractions according to Graefe, 14 enucleations, 39 operations upon the iris, 16 tenotomies. Detachment of the retina was successfully treated with pilocarpine. BURNETT.

WICHERKIEWICZ (12) treated 2,343 patients and performed 329 operations in 1881; among the latter there were 60 cataract-operations, of which 15 were done by simple linear extraction, 27 by modified linear extraction according to Graefe (with two moderately good results and one failure); 16 lenses were extracted within the capsule with two moderately good results; 62 iridectomies, 20 squint-operations, 1 sclerotomy, 1 optico-ciliary neurotomy. Besides these statistics there are also reports of cases, for instance: chlorosarcoma, rupture of the retina; traumatic amblyopia; lachrymal fistula, and necrosis of the nasal process of the superior maxillary bone; scleritis; myopia; glaucoma under compressive bandage; a rare form of keratitis; foreign body in the eye; general remarks on operations; iodoform.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

a.—GENERAL PATHOLOGY AND DIAGNOSIS.

1. ALBINO. Tavole per le prove ottiche in oculistica precedute da alcune rifflessioni sulle scale tipografiche. Napoli, 1882. 2d ed. Test types according to Snellen.

2. AYRES. The pathology of sympathetic ophthalmia. These ARCHIVES, vol x, No. 3.

3. BERRY, G. A. On a practical test for the color-sense. *Ophthal. Rev.*, May, 1882, p. 179.

4. CABALLERO. De la oftalmometrologia, sus procedimientos y aplicaciones. Capit. iii. Coreometria. Determinacion de la figura y dimensiones de la pupila. *Revista espec. de oftalm.*, April, 1882.

5. FALCHI. Tuberculosi dell' occhio per inoculazione. *Rev. di Ottalm.*, vol. xl, 2 and 3, and *Giorn. d. R. Accad. di Med. di Torino*, April, 1882.

6. GOLDZIEHER. Perimetry. *Real-Encyclopädie*, vol. x. Nothing new.

7. HOSCH. The field of vision and its measurement. *Correspondenzblatt für schweiz. Aerzte*, 1882, No. 8. Nothing new.

8. Contribution à l' ophthalmometrie. *Ann. d' oc.*, May, June.

9. JULES. Improved ophthalmoscope for refraction. *Lancet*, No. 20.

10. KRAUSE. The micrococci of blenn. neonat. *Centralbl, f. pract. Augenheilk.*

11. KRÜCKOW. Test types to determine the power of vision. Moscow, 1882. Russian.

12. SCHUCHARDT. Vaccinated tuberculosis of the eye, and its connection with general vaccinated tuberculosis. *Phys. Soc. at Breslau*, June 11, 1881. *Breslauer aerztl. Zeitschr.*, 1882, Nos. 9 and 10.

13. SNELLEN. Optotypen, tot bepaling der Gesichtscherpte. Utrecht, 1882. A new Dutch edition of these excellent test types.

14. DE WECKER. La cicatrice à filtration. *Ann. d'ocul.*, March–April.

According to AYRES (2), the sympathetic irritation may be transmitted either through the optic nerve (optic neuritis) or through the ciliary nerves (cyclitis).

BERRY, G. A., (3) desires to draw attention to the importance of **testing the light-sense**, and points out the possibility of its value as an aid in diagnosis. He claims for his instrument, facility of manipulation, economy of time, that ordinary daylight is sufficient for its use, and, lastly, that it furnishes data which admit of comparison. The instrument consists of a hollow prism which is filled with finely divided Indian ink, suspended in water, to which is added a little glycerine and carbolic acid. A black screen with a slit moves in front of the prism, and along the top of the latter is a scale marking in millimetres the thickness of the fluid. The density of the mixture is determined by the fact, that on looking through the thickest end of the prism the normal visual acuteness is reduced $\frac{20}{100}$ or thereabouts. In using the instrument the observer first adjusts the slit opposite the portion of the fluid sufficiently dense to allow **the smallest amount of light** to pass **with which he retains his full vision.** The visual acuteness of the patient is then taken for the same position and noted, and if it is below the acuity obtained by the ordinary examination in a good light, the screen is moved along toward the apex of the prism to the position which just admits of his full vision. FITZGERALD.

FALCHI (5) reports on seventeen experiments upon the **transmission of tuberculosis by vaccination,** partly with bovine, partly with human, tuberculous substance. The former was used in eleven rabbits, and was introduced in eight cases by paracentesis into both the cornea and anterior chamber, in two only into the cornea, and in two through the sclera into the vitreous. After inoculation into the cornea and anterior chamber, not the iris was the first to be affected, as Cohnheim observed, but the sclerotic, the cornea, the ciliary processes, and the anterior section of the choroid and retina (8 to 10 days of incubation), and then the iris (after 17 days).

The eye in toto and other organs became infected forty-three days after inoculation. In regard to the point of introduction the tuberculous infiltration passed the equator but once when inoculated into the anterior chamber, though the animals became completely cachectic; but when the tuberculous substance was introduced into the vitreous, the disease rapidly spread toward the anterior part of the globe.

The tubercle-nodules and giant-cells of the cornea are embedded in thickened connective tissue, from which the giant-cells develop. The tubercle-nodules of the cornea undergo caseous degeneration.

In five of the seven cases of vaccination with human tuberculous substance it was introduced into the cornea and anterior chamber, once into the cornea

only, and once into the vitreous. The cases were observed for four months and twenty-four days. The results were the same as with bovine vaccine, though the general affection of the eye and other organs did not set in until seventy-four days later. The author concludes that the two tuberculous substances are identical, and therefore equally infectious.

It may be mentioned that in opposition to Cohnheim, the author saw an increase in the intensity of the symptoms in proportion to the quantity of tuberculous substance introduced. When only a small quantity was introduced into the vitreous, the infection spread but slowly from the retina and choroid; but when a large quantity was taken, violent panophthalmitis set in.

In another paper (*Giorn. d. R. Accad. di Med. di Torino*, Apr.) FALCHI describes two cases of **tuberculosis in the human eye**. In one the disease started from the retina and choroid, and spread into the vitreous, the ciliary processes, and the inner layers of the choroid; in the other it originated in the iris and ciliary body. DANTONE.

(8) General remarks upon astigmatism and a discussion of the ophthalmometer of JAVAL-SCHJÖTZ. In young persons (up to fifty) an astigmatic accommodation of the lens is frequently found, which only disappears after the energetic and continued use of mydriatics. As the astigmatism of the lens frequently corrects that of the cornea, young patients are sometimes deprived of this advantage by correcting the total astigmatism. In the ophthalmometer of Javal-Schjötz Javal has attached a scale to the metallic arch upon which the objects move whose images are to be reflected from the cornea, which directly gives the astigmatism in dioptries. MARCKWORT.

(10) A negative result was obtained in various animals from vaccination with pure blennorrhoic secretion or cultivated material. The **micrococci of blennorrhœa** are attached to each other in the secretion in shape of a double bun, which form they generally retain when cultivated. Their size varies, however, under such circumstances. When carefully cultivated the color of the micrococci is yellowish gray. They grow very slowly, and advance in form of a thin film in every direction from the point of vaccination. The surface presents a moist appearance.

The **local effect of the tuberculous infection** (12) never failed entirely in the rabbit; it could be observed in at least one eye. The character of the material used was the reason why the vaccinated tuberculosis did not appear in its pure form, the operative procedure being followed by caseous panophthalmitis. In the majority of animals, however, the tuberculosis remained purely local, and confined to the eye. *V.* No. 76 of the last report. *Arch. f. Augenheilk.*, vol. xi, p. 406.

According to WECKER (14), the efflux of the intra-ocular liquid becomes more rapid after sclerotomy, as the tissue becomes thinner over the scar.

MARCKWORT.

b.—THERAPEUTICS.

1. ABADIE and MARTIN. Letters to Warlomont on the priority of galvanopuncture in detachment of the retina. *Ann. d' ocul.*, March, April.

2. BATTESTI. De la galvano-caustique en chirurgie. *Thèse de Paris*, 1882.

3. BADAL. Leçons sur l' opération de la cataracte. *Gaz. hebd. des sciencces méd. de Bordeaux*, No. 20. Nothing new.

4. BOLLIET. De la greffe cutanée et de ses applications, principalement à la chirurgie oculaire. *Thèse de Paris*, 1882.

5. COSPEDAL. Neurotomia optico-ciliar para combatir una oftalmia simpàtica. *Rev. espec.*, April, 1882. Internat. Med. Congr. at Sevilla.

6. TALLERONI. L' uso della calamita nella chirurgia oculare. Morgagni, Feb., 1882.

7. FORT. Les derniers perfectionnements de l' opération de la cataracte. *Gaz. des hôp.*, No. 29.

8. FRÖHLICH. The change of poles in the use of the electro-magnet, and the magnetic needle as a means of diagnosis. *Klin. Monatsbl.*, April, 1882.

9. GALEZOWSKI. De la syphilis oculaire et son traitement par les injections hypodermiques mercurielles. *Rec. d' ophth.*, May, 1882, No. 5. Subcutaneous injections the best method. MARCKWORT.

10. HAASE-HERSCHEL. On stretching of the optic nerve. *Hamburg Med, Soc.*, Dec. 27, 1881; *Deutsche med. Wochenschr.*, April 29, 1882, No. 18.

11. HIRSCHBERG. Anatomical and practical remarks on the extraction of senile cataract, artificial pupil, and tattooing of the cornea. *A. f. O.*, vol. xxviii, 1.

12. HIRSCHBERG. A case of extraction with a magnet. *Berl. klin. Wochenschr.*, 1882, No. 21.

13. MAKLAKOFF. La sphinctérectomie et le sphinctérectome. *Arch. d' ophth.*, vol. ii, 3.

14. OSIO. Nuevo metodo para la operacion del estafiloma opaco total de la córnea. *La oftalm. prdct.*, May.

15. PAMARD. Elongation des deux nerfs optiques. *Soc. de biol.*, April 12, 1882. *Gaz. méd de Paris*, No. 16; *Gaz. des hôp.*, No. 44.

16. DE LA PEÑA. Neurotomia optico-ciliar para combatir una oftalmia simpàtica. *La oftalm. prdct.*, April and May.

17. DE LA PEÑA. Tratamiento consecutivo à la extraccion de la catarata. *La oftalm. prdct.*, May.

18. DE LA PEÑA. Operaciones consecutivos à la extraccion de la catarata. *La oftalm. prdct.*, June.

19. RÄHLMANN. The optical effect of hyperbolic lenses in keratoconus and irregular astigmatism, and their use for glasses. *Klin. Monatsbl.*, April.

20. ROMIÉE. De l' opération de la cataracte. *Ann. de la soc. méd.-chir. de Liège*, May, 1882.

FRÖHLICH (8) declares that in **strong electro-magnets it is unnecessary to change the poles.** A delicate electro-magnetic needle, carefully employed, indicates the presence of even small pieces of iron and steel within the eye. It is advisable to make the foreign body magnetic by stroking the sclera before the needle is brought into use. Great proximity of the foreign body can be diagnosticated with certainty from the character of the vibrations.

In order to **stretch the optic nerve,** HAASE and HERSCHEL (10) make an incision into the conjunctiva about 2 *cm.* long between the internal and inferior recti; the globe is then well rotated outward by means of a squint-hook inserted under the internal rectus. A hook whose curvature is adapted to the globe is then passed back and around the nerve, which is then strongly drawn forward several times. Recovery without any reaction. Up to date thirteen cases of stretching of the optic nerve are on record. In some there was a marked improvement; V increased, and in one case the field of vision was much enlarged. It is more desirable to operate at the inner than the outer side of the globe, as there are no muscles in the way, and the optic nerve can be reached more easily.

HIRSCHBERG (11) advises to **cleanse the instruments** before the operation in a 5 % solution of benzoate of soda. Bandage: cotton impregnated with the solution of benzoate of soda, changed twice a day and also in the evening of the day of operation (for several years the author has changed the bandage the evening of the first day). The paper ends with an **anatomical description of four enucleated eyes which had been operated for cataract.**

The **sphincterectome** (13) consists of the pinces-ciseaux and a delicate hook of silver or soft iron, which may be pushed forward between the blades of the scissors and again withdrawn by means of a narrow metal plate attached to the outer right side of the handle of the instrument. After the corneal section, which need be but small, the hook is advanced, pushed forward into the anterior chamber until it has seized the sphincter, and again withdrawn. The piece of iris thus seized then lies exactly between the branches of the scissors and is abscised. Advantages: the certainty of obtaining the shape and size of the coloboma intended, without fearing that the sphincter will remain behind, which may even be excised for itself. The painful seizure of the iris with the forceps is dispensed with. Makes assistance unnecessary. It is especially to be commended for extraction. V. MITTELSTÄDT.

It happened to PAMARD (15) while **stretching the left optic nerve** (bilateral atrophy and severe neuralgia), that it tore. The patient soon died. This would seem to show that the operation is not so safe as has been mentioned.

Hyperbolic lenses (19) increase the power of vision in keratoconus and extend the field of vision, V being improved both for distance and near by. The objects fixed appear considerably larger.

According to ROMIÉE (20), **age has no effect upon a cataract-operation.** After-treatment as simple and short as possible. Before the operation the muriate of quinine is dropped into the conjunctival sac; for other purposes carbolic acid is used as a disinfectant. V. MITTELSTÄDT.

III.—INSTRUMENTS AND REMEDIES.

a.—NEW INSTRUMENTS.

1. GRAEFE. Epicritical remarks on operations for cysticercus, and description of an ophthalmoscope for localizing. *A. f. O.*, vol. xxviii, 1.

2. MAYERHAUSEN. Clinical demonstration of the angle Y. *Centralbl. f. Augenheilk.*, Apr.

3. RÖHRIG. Self-adjusting shell-plate entropium forceps. *Buffalo Med. and Surg. Journ.*, vol. xxi, 9.

b.—REMEDIES.

1. GALEZOWSKI. Du spray phénique comme moyen préventif et curatif de la kerato-iritis suppurative dans l' extraction de cataracte. *Rec. d' ophth.*, No. 5, May. Is absolutely necessary, both during the operation and at every change of the bandage. MARCKWORT.

2. MC KEOWN. Observations on pilocarpine. *Dublin Journ.*, May.

3. MANDELBAUM. Sur l' action de cyanure de mercure dans les affections oculaires syphilitiques. *Rev. de thérap. méd.-chir.*, vol. xi. Has an excellent effect.

4. OLIVER, C. A. The comparative action of sulphate of daturia and of sulphate of hyoscyamia upon the iris and ciliary muscle. *Amer. Journ. Med. Scien.*, July, 1882.

5. REICH. Note upon the use of resorcin in ocular affections. *Minutes of the Kank. Med. Soc.*, Nos. 11 and 12.

6. SCHÖLER. Fluorescine and its importance in investigating the osmose of liquids in the eye. *Berlin phys. Soc.*, Feb. 24, 1882; *Arch. f. Anat. und Phys.* Physiol., parts 1 and 2. *v.* last rep., No. 126.

7. VOGL. Physostigma venenosum. *Real-Encyclop.*, vol. x.

MC KEOWN (2) used pilocarpine, partly with good effect, in detachment of the retina, optic neuritis, scleritis, and corneo-scleritis.

OLIVER'S (4) conclusions are as follows: While $\frac{1}{40}$ to $\frac{1}{20}$ of a grain of either sulphate of daturia or sulphate of hyoscyamia is sufficient to paralyze the accommodation of an emmetropic or healthy ametropic eye, it is not sufficient for an unhealthy ametropic eye, nor is one instillation sufficient for the determination of refraction in asthenopic cases. Maximum dilatation of pupil is produced by such a dose of either drug, but the total paralysis produced by the daturia is attained later and passes away sooner than that caused by the hyoscyamia; the mydriasis of a single instillation of the daturia is not so quickly attained and passes away sooner than that of hyoscyamia. The full action of the daturia remains intact for a shorter time than that of hyoscyamia—the time being about double. The use of a neutral salt prevents the irritant and astringent action of the drugs on the conjunctiva.

The constitutional effects of a single instillation of daturia are very slight, while those of hyoscyamia are sometimes grave. BURNETT.

IV.—ANATOMY.

a.—GENERAL ANATOMY.

1. DUJARDIN. Un cas de persistance de la membrane pupillaire. *Journ. des sc. méd. de Lille*, 1882.

2. FANO. Microphthalmus unilateral. *Journ. d' oculist*, No. 109.

3. GEGENBAUR. Further remarks on the pars facialis of the human lachrymal bone. *Morpholog. Jahrbuch*, vol. vii.

4. GRIFFITH. Congenital coloboma of the iris of the right eye, with microphthalmus on the opposite side. *Ophth. Rev.*, May.

5. MARCHI. Sugli organi terminali (nervosi corpi Golgi) nei tendini dei muscoli motori del bulbo oculare. *Arch. per le scienze méd.*, vol. v, 15. *Arch. f. Ophth.*, vol. xxviii, 1.

6. MAYERHAUSEN. Direct inheritance of double microphthalmus. *Centralbl. f. Augenheilk.* Microphthalmus through three generations.

7. RANIER. Étude sur l' occlusion des paupières chez l' embryon. *Thèse de Paris*, 1882.

8. RUMSCHEWITSCH. Coloboma oculi, membrana pupillaris persistens, polycoria. *Centralbl. f. Augenheilk*, May.

9. RUMSCHEWITSCH. A case of preserved embryonic pupillary membrane. *Centralbl. f. Augenheilk*, May.

10. RUMSZEWICH. Description of five cases of membr. pupillaris perseverans. *Pamietnik Towarzystwa Dekark.—Warszawskiegs*, vol. lxxviii, pp. 49-62.

11. TARANETZKY. Anatomy and development of cyclopia in man, and remarks on general malformations. *Med. Bibliothek*, April, 1882.

TARANETZKY (11) writes the following from his own observations, as well as from the literature of the subject (**Cyclopia**):

The head is of the hydrocephalic type. The remains of the nose, when present, form a snout-like projection over the eye (on the glabella). Eyebrows higher, and confluent when nose is wanting. Large round orbit, divided into two parts, surrounded by lids. Latter absent in a few cases, where the eyeball may either be wanting or present. (Anophthalmia cyclopica vera et spuria.)

Generally three lids with eyelashes (one composed of two upper lids and two separate under lids); less frequent, two upper and two lower, and sometimes one upper and one under lid, or one circular, or five lids (three upper and two under lids).

Generally two lachrymal points, varying from one to four (according to the number of lids); canaliculi end blind, since there is no nasal cavity. Sometimes a third lid; sometimes two caruncles.

Of the bones of the skull, the os occipit., basilare, and ossa parietalia are normal in structure. Of the temporal bones, the bones of the inner ear, are generally abnormal; sometimes the drum-membrane and ossicles are wanting. Sphenoid bone always of slight development, especially the body and the smaller wings; the latter are grown together, and when there is an optic nerve, they form a foramen opticum.

The superior maxillary shows the greatest malformation of the bones of the face; they are grown together, remaining separate only on the facial and orbital surfaces, and form the largest part of the floor of the orbit. The processus frontales wanting.

The form of the cyclopic orbit is easily understood if we consider it as formed of both orbits together. The most pronounced defects of the brain are found in the anterior part, which is formed from the anterior cerebral vesicle, or those parts which are anterior to the cerebral peduncles. The "interbrain" (intermediary brain, thalamencephalon) is less changed, and forms a solid mass depending upon the union of the optic thalami. If the cerebral cortex is insufficiently developed, this mass lies free in the cranial cavity. The under surface of the optic thalamus forms the whole base of the brain; on the under

surface there are two prominences: the first is the undivided corpora mamillaria; the second, the tuber ciner., infundibulum, and hypophysis cerebri.

Anterior to both, and from the anterior end of the combined optic thalami, the optic nerve passes out, generally a single trunk. Very seldom are there two tracts, which afterward coalesce into one. Frequently the optic nerve is wanting. Anterior to this the optic thalamus is confluent with the frontal lobes. The upper surface of the optic thal. is confluent with the posterior inferior part of the frontal lobe. The upper surface of the optic thalamus mass is always divided into two parts by a groove. The corpora geniculata are wanting. Commissura anterior and mollis not developed.

Only the anterior part of the optic thal. stands in connection with the anterior part of the brain; it is connected either by a rudimentary corpus striatum, or if this is wanting, by a transition of the corona radiata into the substance of the cerebral cortex.

The form and shape of the anterior part of the brain varies very much, according to the quantity of cerebral liquid, and has only rarely the appearance of cerebral hemispheres. The upper convexity of the anterior brain is flattened, the large sagittal suture is absent, also the convolutions and transverse fissures. The occipital parts of the combined hemisphere, so to speak, are sometimes wanting.

On account of the great pressure of the pial fluid symptoms of inflammation of the meninges are demonstrable.

According to the form and development of cyclopic eyes he distinguishes three groups with possible intermediate conditions.

1. There are only irregular remains of an eye in the common orbit: anophthalmia cyclopica. This form is rare. 2. One eye, with evident signs of having been formed from two eyes, presents different varieties. The most frequent form of this is: oval globes, one optic nerve, a single sclera, choroid and retina, a double cornea, anterior chamber, pupil, lens, and capsule. Very seldom we find the anterior part single, and the posterior double, with double optic nerve, which becomes single further back. 3. One eye, without any external signs of division (sometimes internal division, as the lens); optic nerve single, sometimes disappearing at the posterior orbital walls; in this case the optic foramen and cerebral portion of the nerve are also wanting, but the retina is normal. He concludes that the cerebral portion of the nerve has been destroyed after having been formed. The idea of Magendie, that the retina can develop independently of the optic nerve is untenable.

The development of cyclopia is the result of an abnormal development of the whole anterior part of the head of the embryo (the anterior end of the medullary tube and the part of the ectoderma connected with it) and is not the result of pathological changes in any of the individual organs. The pathological process has its origin in the forebrain and interbrain, and those parts which form the anterior wall of the anterior cerebral vesicle (primitive frontal region of the skull).

The causes of the malformation, according to the author, are twofold: 1, pressure from without (not hydrocephalic, which is only of secondary importance) caused by a too narrow anterior amnios-fold, the so-called skull-cap; and 2, inflammatory processes, the remains of which can be recognized in the membranes of the cerebrum, and also in the bony and soft parts of the head and the

face. The inflammation in that part of the pia which covers the forebrain, interbrain, and midbrain is more pronounced, and on account of this the large ensiform process is not formed, and the division of the hemispheres does not take place. The forebrain is thereby rendered flat. In the interbrain the two sides are made to coalesce by pressure; and in the midbrain the pressure hinders the regular separation.

The inflammatory process in the lateral portions of the anterior cerebral vesicle (end of first week) can prevent the formation of the ocular vesicle, or, working together with intracranial pressure, can destroy the ocular vesicle if it has been already formed. This would be the first form of cyclopia-anophthalmia. In the third form of cyclopia, the two ocular vesicles are forced into one by pressure, after they have been formed (beginning of second week). There will then be only one ocular vesicle with one pedicle, and by a further abnormal development, one eyeball, and one nerve, which will come from the under side of the optic thalamus. In the second form of cyclopia the two ocular vesicles and their pedicles were formed at the base of the brain, but later coalesced. The formation of the lenses and other parts has already begun before this. By the influence of pressure either the anterior or the posterior (this more often) parts may grow together.

All causes which can produce cyclopia exert their influence in the human embryo during the second and third weeks.

The diseases of the embryo may have their origin in psychical or physical influences on the organism of the mother; also congenital morbid processes in the parents of the child. HIRSCHMANN.

b.—RETINA.

1. RANVIER. Anatomie de la rétine. *Arch. d' ophth.*, April.

2. RENAUT. Sur la rétine du type juxta-épendymaire. *Rev. génér. d' ophth.*, May, June.

3. SPINA. Observations on the different types of connective tissue. *Wiener med. Blätter*, No. 23. The two finely granular parts of the retina seem to be made up of delicate meshes, which are capable of motion.

RANVIER (1) considers that there are eleven layers of the retina. Pigment-epithelium, rods and cones, limitans ext., nuclei and cells of the cones (visual cells), basilar plexus (with basal cells in some animals), bipolar and unipolar cell layer, cerebral plexus, layer of multipolar cells, layer of optic-nerve fibres, limitans interna. He gives also the anatomical structure of the different layers, the connective tissue, and blood-vessels of man, and several other vertebrata and batrachia. Method of preparation: Put the eye of a triton in a bottle of osmic acid for half an hour; then open the eye in its equatorial plane and place it in dilute alcohol for twenty-four hours. Then color with picro-carmine, and later harden it further with 1 % solut. of osmic acid. V. MITTELSTÄDT.

c.—OPTIC NERVE.

1. BERGER. On the finer structure of the optic nerve. *A. f. A.*, vol. xi, 3.

2. FUCHS. Contribution to the knowledge of congenital anomalies of the optic nerve. *A. f. Ophth.*, xxviii, 1.

3. SAMELSOHN. On the anatomy and nosology of retro-bulbar neuritis. Course of the macula fibres in the optic nerve. *A. f. Ophth.*, vol. xxxviii, 1.

4. STILLING, J. Examination of the structure of the central optic organs. First part: chiasma and optic tract, with ten lithographic plates. Kassel and Berlin, 1882.

(1) The anterior layers of the bands of the lamina cribrosa come from the choroid; they are somewhat more delicate than those which come from the sclera. Both sets stand in close connection. In the vicinity of the edge of the optic nerve those which come from the choroid have isolated pigment cells between them in the adult. He does not agree with Kuhnt's idea, that those which come from the choroid are to be looked upon only as adventitial fibres of the blood-vessels.

In some vertebrates the choroidal part of the cribriform membrane shows similar conditions.

FUCHS (2) has frequently found **small crescents on the lower border of the optic disc.** They are congenital, being an analogue to the coloboma of the inner membranes. They are generally associated with myopia and impairment of vision.

According to SAMELSOHN (3) the **macula fibres** are, at the optic canal, situated exactly in the axis of the nerve trunk, surrounded by a peripheric uniform zone of nerve bundles, which are subservient to the eccentric vision. Shortly after the exit of the optic nerve from the osseous canal, the above axial situation changes so that the corresponding fibres pass gradually over to the temporal side. The bundle of fibres is cylindrical in shape until it reaches the temporal edge of the nerve, immediately before the entrance of the central vessels, where it suddenly changes its form. In the shape of a wedge, the point of which is turned toward the central vessels, it reaches the papilla, from which it radiates into the retina in the well-known manner described by J. Michel.

STILLING (4) publishes a very elaborate treatise which is of the greatest importance for the knowledge of the **central optical organs.** It is based throughout on original investigations, and is distinguished most favorably from the current literature by a conscientious consideration of the historical part. Stilling's work demonstrates that historical knowledge is not indispensable even for purely practical researches in which the anatomical knife and the microscope are used.

The **chiasm,** according to Stilling, is formed of four different fascicles of nerve fibres, three of which constitute the optic nerve proper; the fourth has to be regarded as a commissure of the central organs, in which the optic-nerve fibres end. These four fascicles are: the uncrossed fascicles of the tract and of the optic nerve of the same side; the crossed fascicles; the anterior arched commissure; the posterior arched commissure. The uncrossed fascicles are the most numerous; next, the two commissural; and least, the crossed. The uncrossed bundles encompass the cord-like crossed bundles laterally like a trough, which is thickest on the side, gradually thinning out toward the middle line, yet constituting considerable layers on the upper and lower surfaces of the chiasm. Apart from the commissura arcuata of Hannover, the chiasm is almost completely enclosed by uncrossed fibres, tract fibres proper, and fibres derived from

the base of the brain. The anterior commissure, which unites the two retinæ with each other, is situated in the anterior angle and on the dorsal surface of the chiasm. A small part of the fibres of the posterior commissure is situated crest-like in the posterior angle of the chiasm, but the greater part is situated on the lower surface of the chiasm, reaching as far as its anterior edge.

The **tuber cinereum** has a double relation to the optic nerves and tracts. It furnishes them direct, uncrossed fibres, and has, besides, the significance of a ganglion inserted into their course. The anterior perforated substance also sends to the chiasm uncrossed fibres passing on its dorsal surface.

In its centripetal direction from the chiasm the optic tract becomes broader and flatter, dividing itself, in about the middle of its course, into two, rarely three, branches, subject, however, to variations. One of the two principal divisions, marked off by a more or less shallow incision, goes to the outer, the other to the inner, geniculate body. Between the two branches which go to the corpora geniculata a third variously developed one is wedged in, the fibres of which are directly continued into the short cord, the brachium conjunctivum anticum apparently connecting the thalamus with the upper corpus quadrigeminum. The surface of the optic thalamus and the corpora quadrigemina is covered by a white stratum of nerve fibres which is in direct connection with the optic tract and may be regarded as the analogue of the *tectum opticum* in certain animals. The three branches of the tract mentioned above participate in the formation of this tectum. The first branch, connected with the outer geniculate body, sends fibres to the tectum of the thalamus and the inner surface of the opt. thal., which forms part of the wall of the third ventricle. The middle branch sends but a few fibres to the tectum of the thalamus, but many to the tectum of the anterior corpora quadrigemina. The third branch sends fibres to the tectum of both corpora quadrigemina, chiefly to the posterior corp. quadrig. The outer corpus geniculatum is bordered, covered, and partially pervaded by fibres of the tractus. A part of the fibres ends in the cells of the corpus geniculatum; the greater part, however, passes through and unites again on the side of the thalamus. The outer corpus geniculatum can, therefore, by no means be regarded as the nucleus of origin of the tract, but only as a ganglion inserted in its course. The same holds for the inner corpus geniculatum; it is likewise penetrated by tract fibres which partially end in it, partially pass through it.

The third division of the tract, the *brachium conjunctivum anticum*, splits at the anterior corp. quadrig. into a superficial and a deep branch. The superficial contains the fibres going to the tectum of the superior corpus quadrigeminum; a part of these fibres passes around the edge of the corp. quadr. into the furrow between both corpora quad., and loses itself in the frenulum veli medullaris superioris. This branch gives off a small branch to the inner surface of the thalamus, entering into the taenia thalami optici. The two superficial branches of both tracts are connected directly with each other by commissural fibres. The deeper branch of the brachium conjunctivum anticum loses itself in the gray substance of the upper corpus quadr. The brachium conjunctivum posticum bears a double relation to the optic tract. On the one hand it connects the gray substance of the outer geniculate body with the posterior corp. quadrigeminum; on the other hand it contains a great number of fibres which pass directly from the optic tract into the posterior corpus quadrigeminum, without any interposition of gray substance. It contains not only direct

and indirect tract fibres, but also such as pass in horizontal direction to the cerebral peduncle.

The **optic thalamus** has a superficial and a deep-seated origin, a tectum, and fibres that enter into the gray substance in its interior. Stilling describes all these fibres accurately. We cannot follow him into all the details, but must point out his surprising discovery that a large quantity of fibres of the optic tract pass through the pes of the crus cerebri to the medulla oblongata. Stilling calls the root to which these fibres belong the *radix descendens nervi optici*. It consists essentially of two bundles leaving the tract one behind the other, viz., a stronger bundle, *radix laquearis* or *radix olivæ inferioris*, and a weaker bundle, *radix pontis*. The radix laquearis is a broad bundle turning away from the trunk of the tract at the inner-upper border of the outer geniculate body. It runs as a compact cord, somewhat longer than 2 *cm.*, directly to the lower olivary body, in the gray substance of which a part of its fibres is lost, while another part runs along its inner surface to pass over into the decussation of the pyramids. The radix pontis leaves the tract a short distance before the radix laquearis, and descends between the external bundles of the pes of the cerebral peduncle until its fibres reach the deep-seated gray strata of the pons.

Furthermore, fibres of the optic tract go into the amygdaloid nucleus, constituting its lowest origin. Besides these, a number of tract fibres leave the tract with the bundles of the radix laquearis, but separate from them to seek new places of origin in the nucleus of the motor oculi communis and in the crus cerebelli.

As to the **distribution of the tract fibres in the brain** and optic nerve, the following fibres of the tract enter the brain: 1, the crossed; 2, the uncrossed; 3, the posterior arched commissural fibres. The uncrossed fibres can be followed as far as the tectum opticum of the optic thalamus, and the gray substance of the pulvinar; a large number pass through the outer geniculate body to terminate in the stratified plates of the optic thalamus. Uncrossed bundles may further be traced up to the corpora quadrigemina. Some pass over the superior surface of the outer geniculate body to the anterior corpus quadrigeminum, and some go to the brachia anticum and posticum and to the radix descendens. Crossed bundles enter into the inner and outer geniculate bodies, the anterior brachium conjunctivum, and the radix descendens.

In **the optic nerve** there are: 1, uncrossed fibres, situated on the outer side and on the upper and lower surfaces; 2, crossed tract fibres; 3, bundles of the commissura arcuata anterior; 4, uncrossed fibres from the tuber cinereum; 5, uncrossed bundles from the anterior perforated substance and the lamina terminalis cinerea. It is impossible accurately to separate all these kinds of fibres in the optic nerve.

d.—LENS AND VITREOUS.

1. AIBY. The **canalis Petiti** and the **zonula Zinnii** of **man** and the **vertebrates**. *Gr. Arch. f. O.*, xxvii, 1.

2. AYRES, W. C. I. The development of the eye. II. The capsule of the lens. *N. Y. Med. Journ.*, vol. xxxv, 5.

3. BECKER, v. On the anatomy of the healthy and diseased lens. *Centralb. f. Aug.*, May; *Rev. génér.*, June; *Ophth. Rev.*, Dec., 1882. Preliminary

communication. Will be reviewed in detail when the forthcoming elaborate treatise has appeared.

4. ROBINSKI, SEVERIN. Investigations on the **length** and **arrangement** of the **fibres of the lens.** *Centralbl. f. d. med. Wiss.*, 1882, No. 21. Preliminary notice. (The elaborate paper has since appeared in the Germ. ed. of these ARCH., Bd. xi, p. 447.)

According to AIBY (1) the **hyaloid** appears macroscopically and microscopically as **a sharply defined membrane**; it does not belong to the retina, but is a limiting membrane proper of the vitreous, which it encloses on all sides, also on its lenticular part. The canalis Petiti is only the peripheral segment of the postlental space, laterally bordered by the zonula, posteriorly by the hyaloid as far as it is not united to the capsule of the lens. The zonula is a real independent membrane, insoluble in acids, whereas the hyaloid is soluble in the same. The zonula is one of the most persistent formations of the animal body.

The length of the lens-fibres (4) in the newborn averages 2.14‴. No fibre passes through the entire half circumference of the lens. The fibre which starts from the anterior pole is inserted almost precisely at the junction of the outer and middle third of the corresponding posterior radius. The adjoining fibres descend, the breadth of a fibre each, from the centre, and in the same manner ascend in the corresponding radius upon the posterior surface toward the centre, until the fibres which start from the junction of the outer and middle thirds of the radius of the anterior surface reach to the posterior pole. In the adult the fibres are shorter than in the newborn, and do not reach the junction of the outer and middle thirds of the radius; but the fibres extend at least more or less than one fourth of their distance from the pole beyond the margin.

e.—COMPARATIVE ANATOMY.

1. BERGER. Contributions to the anatomy of the visual organ of fishes. *Morph. Jahrb.*, vol. viii, 1.

2. DENISSENKO. The retinal structure of the eel. *Arch. f. mikrosc. Anat.*, vol. xxi, 1.

3. DENISSENKO. The retinal structure of lota vulgaris and ophidium barbatum. *A. f. Ophth.*, vol. xxviii, 1.

4. DEFOSSÉS. Œil du protée. *Note présentée par M. le prof. Robin à l' acad. des sciences*, June 26, 1882, No. 26.

5. HARTOC. De l' œil impair des crustacés. *Compt. rend. hebd. des séances de l' acad.*, No. 21.

6. HIRSCHBERG. The eyes of amphibia and fishes. *Read before the Physiol. Society of Berlin*, May, 1882.

7. HIRSCHBERG. Comparative ophthalmoscopy. *Arch. f. Anat. u. Physiol.*, Abth. 1 u. 2.

8. VIRCHOW. The blood-vessels of the vitreous and retina of the eel. *Morph. Jahrb.*, vol. vii.

DENISSENKO (2) is opposed to Krause, who says: "What has been described as the layer of outer granules in the retina of the eel, is only the outer portion of the inner layer of granules.

DESPOSSÉS (4) has very carefully examined the eye of proteus and has arrived at the following conclusions: the eye contains: 1, an outer membrane, which may be compared to the sclerotic, with cartilage corpuscles interspersed; 2, a choroid, consisting of a thin capillary layer and pigmented cells, upon its inner surface a limiting membrane; 3, a retina with optic nerve. The retina has seven layers: an epithelial-pigment layer, an outer molecular, outer granules, an inner molecular, and a layer of inner granules, ganglion cells and nerve fibres. But the eye of this animal has neither lens nor vitreous, in fact no organ of refraction.

According to HIRSCHBERG's (7) statement the eyes of animals are mostly hypermetropic; from the teleological stand-point it may be remarked that, if a positive accommodation by a voluntary thickening of the lens is present, the hypermetropic eye, with its short axis, is the most suitable; since for distant vision a short axis can be adjusted by a slight relaxation of the accommodation, whilst the correction of a lengthened axis requires an artificial apparatus. He describes more accurately the ophthalmoscopic picture of different animals, as the frog, pigeon, guinea-pig, rabbit, dog, cat, horse, various fishes, etc.

V.—PHYSIOLOGY.

a.—GENERAL PHYSIOLOGY.

1. ALTMANN. On Prof. Abbe's introductory remarks to his "limits of geometrical optics." *Arch. f. Anat. u. Phys.*, 1882, vol. i.

2. BERRY. A practical test for the light-sense. *Ophth. Rev.*, vol. i, 7.

3. CHARPENTIER. Sur quelques usages du trou sténopéique. *Arch. d' Ophth.*, vol. ii, 3, and *ibid.*, by the same author: Nouvelles recherches sur la sensibilité de la rétine. Influence of illumination and size of objects upon the light- and color-sense.

4. DUMONTPELLIER. Action du regard ou de la lumière réfléchie des yeux de l' expérimentateur sur les yeux de l' hystérique. *Soc. de la biol.*, March 18; *Compt. rend. hebd. des séances de la soc. de la biol.*, No. 11.

5. FITZGERALD. Deficiency of visual acuteness in seamen. *Oph. Soc. of Great Brit.*, March 9; *Lancet*, No. 12; *Ophth. Rev.*, vol. i, 6.

6. FORBES. A new form of schematic eye. These ARCH., vol. x, p. 256.

7. GIACOSA. The albuminoids of the human vitreous body. *Giornale della R. Accadémia di Torino*, 1882, 1 and 2.

8. GONY. Remarques sur la vitesse de la lumière. *Compt. rend. hebd. des séances de l' acad.*, No. 19.

9. HERRMANN. The refraction of oblique rays, with special consideration of the eye. Part III. *Arch. f. d. ges. Physiol.*, vol. xxvii.

10. LEROY. Sur la théorie de l' astigmatisme. *Rev. génér.*, April.

11. MAGNUS. The influence of work upon the human eye. *Humboldt*, 1882, April.

12. MATTHIESSEN. The relations between the refractive index of the centre of the nucleus of the lens and the dimensions of the eye. *Arch. f. d. ges. Physiol.*, vol. xxvii.

13. MATTHIESSEN. The twenty cardinal points of the human eye. *Klin. Monatsbl.*, May.

14. PARENT. Comment sont réfractés les rayons tombant obliquement sur l' œil. *Rec. d' ophth.*, vol. iii, 4. They produce astigmatism; the degree of antigmatism increasing with the size of the angle of incidence.

15. PARINAUD. Du siége cérébral des images consécutives. *Compt. rend. des séances de la soc. de biol.*, No. 18.

16. POUCHET. Sur une espèce particulière d' images consécutives d' origine cérébrale. *Compt. rend. des séances de la soc. de biol.*, No. 16.

17. PREYER. The soul of the child. Observations on the mental development of man during the first years of life. *Leipzig*, 1882, vol. xii, p. 424.

18. VON REUSS. Photophobia. *Real-Encyclop.*, vol. x.

19. SAMELSOHN. Soul-blindness in man. *Berl. klin. Wochenschr.*, 1882, No. 20.

20. SCHLAGER. De l' influence de la lumière bleue sur les aliénés. *Ann. et bull. de la soc. de méd. de Gand*, 1882, June.

21. SCHUBERT. Influence of inclined letters upon the eyes of children. *Aerztl. Intelligenzblatt*, No. 21.

(3) By means of a small stenopæic opening we can determine the acuteness of vision, ametropia, and approximately its degree, and also the punct. remot. in myopia. An opening of $\frac{8}{10}$—$\frac{9}{10}$ *mm.* diameter with smooth margins corrects ametropia of 12 D and more, also irregular astigmatism. By removing the apparatus from the eye, the objects appear smaller in M., larger in H., in E. they are unchanged, in regular astigmatism broader or narrower in certain directions. By lateral displacement of the stenopæic hole the objects apparently move, in the opposite direction in H., in the same direction in M., in E. there is no apparent motion. The extent of the excursions corresponds to the length of the axis of the eye, resp. the degree of ametropia. In M. the motion ceases when the fixed object is placed at the punct. remot. By this means we can also ascertain whether the correcting glasses are properly chosen. v. MITTELSTÄDT.

GIACOSA (7) finds in the vitreous o.12 % albumen; mucin in smaller quantities. Besides, there are globulin and an albuminous substance similar to the albumen of the serum of the blood.

PARINAUD (15) tries to demonstrate that the after-images have their origin not in the eye but in the brain.

PREYER (17) treats, in an excellent work, of the mental development of the child, comprising in the first chapter of the first part the development of vision. In the mature newborn the sense of light is present either immediately, or a few minutes, or, at the highest, a few hours after birth; light and darkness are distinguished. Besides, there is the function of the reflex from the optic to the oculomotory nerve; we have, therefore, a congenital double-sided reflex, since both pupils react, even when light is thrown into one only. The sensitiveness to light increases to photophobia in the newborn, soon after they awake or after they have been kept in the dark, but this disappears in the course of a few days, and they soon begin to delight in looking at bright objects.

Preyer's observations in regard to the development of the color-sense in the

child are highly interesting, and will be a valuable support to the theory of a gradual development of the color-sense in the human race, a view which has also been expressed by SOURRY (comp. color-perception in this report). What Preyer says about the development of the color-sense in the child, has been maintained by the reviewer in regard to the development of the color-sense in the human race. MAGNUS asserts that man has first perceived the long-wave colors, whilst the short-wave colors, green and blue, at that phase only caused an impression of light, *i. e.*, gray, resp. black or dark, and that the perception of blue and green has appeared at a later phase of development. To this physiological development of the color-sense corresponds also the nomenclature of colors which in all tribes thus far examined is exact for the long-wave colors, but very insufficient for the short-wave colors. If we compare these assertions of the reviewer with the results of Preyer we will hardly be able to overlook their striking coincidence. Preyer says: Of the four principal colors, yellow and red are pronounced correctly at a much earlier period than green and blue. It is indeed probable that blue and blue-green are at first not perceived as blue and blue-green, but as gray and black. Gray, no doubt, is early recognized correctly, but is often called incorrectly, because green and blue probably produce the same impression. During the second year and the first half of the third we may call the child insensible to the short-wave colors. We cannot assume that a child of two years is incapable of calling blue and green correctly on account of its inability to clearly associate the names of blue and green with distinct impressions, because yellow and red have many months before been pronounced correctly. If green and blue were perceived just as distinctly as yellow and red, there would not be the least reason to name them incorrectly and to prefer red and yellow to them under all conditions. But the child does not yet know the meaning of green and blue when it is already familiar with yellow and red.

In reference to the motions of the lids, Preyer ascertained that they can take place atypically in the first weeks; for instance, the upper lid is raised when the eye is cast down, or one lid is dropped; the other is raised, only when being kept open. Besides, when the look is cast upward the lid frequently is not raised with it. The closure of the lids on intense light-impressions is congenital. The so-called winking does not occur in the newborn; only after the first three months winking occurs on the sudden approach of an object near the eye. From the time of birth, supreme satisfaction is expressed by wide open eyes, displeasure by closure and contraction of the lid.

Ocular movements are often performed combinedly and co-ordinately by the newborn in the first days; still very frequently also one eye moves entirely independent of the other; the rotations of the head may be diametrically opposite to the motions of the eyes, so that the absence of intention of the two movements is obvious, and their concurrence appears accidental. Preyer's observations are in favor of the assumption that the conscious visual act is of decisive influence on the regulation of the ocular movements; that harmonious centromotor impulses are directed from the optic centre to the oculomotor, abducens, and trochlearis muscles of both eyes only after the separation of the light-impressions, and that in the beginning, before the power of vision is confirmed, the ocular motions are not associated and not co-ordinated.

Previous to the tenth day, movements of fixation of the eye do not occur; the child may turn the head, but not the eye toward a bright object.

There seems to be a preformed connection between positions of convergence and accommodative tension. The shape of an object is not clearly recognized in the first weeks, but only its brightness. Accommodation is perfect long before the perception of distance; the child is able to see distinctly, one after the other, objects at a varying distance, without knowing any thing of the difference in the interspaces. These interspaces it learns to appreciate later. In regard to the refraction, Preyer's statements are exceedingly meagre.

According to SAMELSOHN (19), there are in man physiological as well as pathological conditions identical with Munk's **soul-blindness.** Soul-blindness may be demonstrated physiologically by those conditions in which, in the act of squinting, the image of the averted eye is excluded from the visual act by intentional suppression. The averted eye perceives the impressions simultaneously with the fixating eye, only the perceptions of the averted eye are not elaborated into ideas. A similar phenomenon, belonging exclusively to the domain of pathology, is furnished by the fact that in hemianopia perception of light is well preserved in the absent halves of the visual field, while no object, no matter what its size, is perceived. Samelsohn has observed two such cases.

SCHUBERT (21) states that he has found that the ordinary sloping writing alphabet is injurious to the eye of the child, rendering it myopic; therefore he pleads for the alteration of the customary handwriting. This view has been recently shown to be erroneous by Berlin and others.

b.—ACCOMMODATION.

1. AYRES, W. C. The physiology of accommodation. *New York Med. Journ.*, XXXV, 3.

2. EMMERT. Die Grösse des Gesichtsfeldes in Beziehung zur Accommodation. (The extent of the field of view in reference to accommodation.) *Archiv. f. Augenheilk.*, xi, 3.

3. JAVAL. Théorie de l' accommod. *Compt. rend. hebd. des séances de la soc. de biol.*, No. 16.

The historical notice of the different **theories of accommodation** in this paper of AYRES (1), though brief, is quite accurate. The main purpose of the paper is to account for the difference in the development of the circular and longitudinal fibres of the ciliary muscle as found in microscopical sections of various eyes. A. claims that we can almost tell the degree of M. or H. from which an eye suffered by an examination of its ciliary muscle under the microscope.

Iwanoff was the first to point out the fact, that in H. the circular fibres were more strongly developed, while in M. it was the longitudinal fibres which were in excess. He considered this due to the hypertrophy of the circular fibres in the hypermetrope from constant use. Loring, on the other hand, believed that excess of longitudinal over circular fibres in M. was due to the drawing out of the circular fibres by the elongation of the ball. Ayres seems to take a teleological view and considers the atrophy of the circular fibres a provision of nature for the protection of the myopic eye. He believes a nicer adjustment of accommodation is effected by means of the longitudinal fibres, and that this nicer ad-

justment is demanded by the myopic eye when it is called upon to use its accommodation.

The pig is the only animal which shares with man and the apes the possession of a strong circular muscle—though almost all the lower animals are hypermetropic. This fact, in conjunction with the other fact, which is admitted by Ayres, that many myopes have as strong a power of Ac. as emmetropes, as evidenced by their ability to see clearly near at hand through their correction glasses, would seem to show that nature was at least not constant in her watchfulness over the myopic eye. In fact, our observation teaches us that vigor of accommodation does not go along with any particular form of eye structure. Many emmetropes are asthenopic, and many hypermetropes are not, and in some myopes of high degree Ac. is in excess of the normal. BURNETT.

The extent of the **field of view** (2), when looking into the distance under the effect of atropine, is nearly the same as in distant vision without atropine. The absolute limits of the field of view are the external expression of the limit to which the light-perceiving parts of the retina can be brought forward; the relative limits of the field of view are the external expression of the limit to which these parts extend.

c.—COLOR-PERCEPTION.

1. BIRGHAM. Farbensinn und Farbenblindheit bei den Hawaiiern. (Color-sense and color-blindness in the Hawaiians.) Ausland, 1882, No. 17.

2. BOLL. Tesi ed ipotesi sulla percezione della luce e dei colori. *Ann. d' ott.*, xi, 2 and 3.

3. BRILL. Color-blindness from a cerebral lesion. *Chicago Med. Rev.*, April 1, 1882.

4. CARRERAS-ARAGÓ. Cuàl es el modo más sencillo y exacto para la determinacion del Daltonismo. Congr. med. de Sevilla. *Rev. espec. de oftalm.*, April, 1882.

5. COHN. Ueber Farbenempfindungen bei schwacher künstlicher Beleuchtung. (On color-perceptions in faint artificial illumination.) *Archiv f. Augenheilk.*, xi, 3.

6. DONDERS. Explications sur les systèmes chromatiques. *Arch. d' ophth.*, May, June. Reply to the criticism of Giraud-Teulon.

7. EMERY. La perception entoptique de la couleur du fond de l' œil. R. acad. delle Scien., 3 série, vol. vi. *Archiv ital. de biol.*, i, 2.

8. FANO. Faculté chromatique de l' œil chez les sujets atteints d' atrophie des nerfs optiques. *Journ. d' ocul.*, No. 111.

9. GIRAUD-TEULON. Sur les systèmes chromatiques par M. Donders. *Ann. d' ocul.*, March, April. Conclusion.

10. HERING. Kritik einer Abhandlung von Donders; "Ueber Farbensysteme." *Lotos*, Bd. ii. Reprint. Prague, 1882.

11. HERMANN. Ein Beitrag zur Casuistic der Farbenblindheit. (A clinical contribution to color-blindness.) *Inaug. Dissert.*, 1882.

12. KOLBE. Untersuchungen auf Farbenblindheit in Russland. *Wratsch*, 1882, Nos. 29 and 32, Russian. Comp. also the detailed reference in *St. Petersburger Zeitung*, No. 237.

13. VON LEIXNER. Æsthetische Studien. Die Farbe im Allgemeinen. Der Character der Hauptfarben. (Æsthetical studies. Color in general. The character of the chief colors.) *Schlesische Zeitung*, April 22, 1882, No. 280. Red acts æsthetically most vividly.

14. LUBBOCK–MONTAGU. On the development of the color-sense. *The Fortnightly Review*, April, 1882.

15. MAGNUS and JEFFRIES. Color-chart for the primary education of the color-sense. May, 1882.

16. MAY, HIGGINSON, DICKINSON. Report upon the teaching of color in the public schools, presented to the Massachusetts State Board of Education by a sub-committee of members of the board. *Journal of Education.*, May 4, 1882.

17. OLIVER. Preliminary paper on the determination of a standard of color-sense for reflected color by daylight, with a graphic description of the individual limits and average results of sixteen cases. These ARCHIVES, xi, i.

18. PFLÜGER. Methode zur Prüfung des Farbensinnes mit Hülfe des Farben-Contrastes. (Method for the examination of the color-sense by the aid of color-contrast.) Zweite wesentlich verbesserte Auflage der Tafeln zur Bestimmung der Farbenblindheit. Berne, 1882. In French, English, and Italian.

19. ROSENSTIEHL. De l' emploi des disques tournants pour l' étude des sensations colorées. Intensité rélative des couleurs. *Comptes rend. des séances de l' acad.*, No. 21.

20. SOURRY. Nouvelles recherches sur le sense des couleurs dans la série animale. *République Française*, May 30, 1882, No. 3,854.

21. SOURRY. Developpement du sens des couleurs chez l' enfant, le sauvage et le barbare. *Republique Française*, No. 3,862, June 27th.

BIRGHAM (1), among 394 aboriginal Kanakas, found 5 **color-blind**, *i. e.*, 1¼%; among 103 female Kanakas, none were color-blind. They often mistake the names of the colors for one another, namely, red for yellow, blue for green.

According to COHN (5), there exist in various individuals differences in the intensity of the artificial light necessary for the perception of colors; in the same way there is quite a difference in this respect between the two eyes of one person. Red, orange, yellow, with inferior degrees of illumination, are recognized as green, blue, violet. Yellow is taken for pink in faint illumination. Violet is recognized with the greatest difficulty. In certain degrees of illumination all pigments appear colorless.

HERING (10), in his criticism of Donders' paper, formulates four propositions: 1. *Donders accepts most of the fundamental doctrines of the theory of contrast colors;* for, besides white and black, according to Donders, there are only four simple colors, red, yellow, green, blue; and for these four simple colors he also postulates specific psycho-physical processes. These processes are said not to be associated with certain, correspondingly different formative elements of the brain, but to run their course in the same substance. The processes designated by Hering as dissimilation and assimilation have been assumed by Donders as dissociation and new-formation of the molecules. Then Donders, in harmony

with Hering, does not explain the complementary phenomena by the theory of fatigue, but he says: Every psycho-physical process corresponding to a perception of color provokes the process corresponding to the contrast color in proportion to its existence and persistence. 2. *Donders attempts to alter the theory of contrast colors in two points.* Herein, according to Hering's views, he becomes involved in contradictions. The first point of alteration is the following: While Hering allows but a single, quite definite perception—that of neutral gray—to correspond to that condition of the visual substance in which consumption and regeneration are in exact equilibrium and the visual substance hence remains unchanged, according to Donders the whole scale of the perceptions produced in us by moderate light corresponds to that condition. The second alteration Donders effects in Hering's theory consists in this, that while according to Hering the visual substance is capable of dissimilating and assimilating in three different ways, according to Donders one and the same molecule is able to dissimilate in five different ways. From these two points Hering seeks to deduce contradictions for Donders. 3. *Donders attempts to combine the four-color theory with the three-color theory.* According to Donders, there are in the retina peculiar morphological elements with separate conducting fibres, which correspond to the three energies, the spectral red, green, violet, the so-called fundamental colors. Fundamental, therefore, are those colors which represent single processes in the periphery. Nothing, however, prevents their provoking a twofold process in the centre and their being, therefore, composite colors. Donders accordingly distinguishes between peculiar processes in the retinal and optic-nerve fibres and between processes in the central psycho-physical substance. This combination of both theories Hering declares to be impossible, inasmuch as Helmholtz's theory does not admit of such a separation of the central and peripheral processes, but assumes that every excitation of a species of fibres in the brain directly causes the corresponding perception. 4. *Disproval of the objections raised by Donders against the theory of the contrast colors.* Refers to five objections raised by Donders against Hering's theory.

Hermann (11) in his dissertation brings nothing but what is well known. The literary references are incomplete.

In the first part of his article, Kolbe (12) discusses the necessity for a test as well as for education of the **color-sense**. The examination of the color-sense hitherto customary in Russia is defective; this is proved by the statistical notes furnished to date. Thus, Dr. Höppner, among 4,601 persons examined, found 60 color-blind, but only 4 with weak color-perception. Dr. Skrebitzky even reports that he had subsequently ascertained that railway employés had deceived him in the examination; namely, officials who were conscious of their defective color-sense had substituted for themselves men with normal vision. A surprisingly high percentage of 6.08 % has been found by Ljubinski. The most valuable series of tests is that of Wyrubow at the Orel-Witebsker railway, because this investigator has used several verifying methods. Especially interesting is the result found by him, that the number of those with weak color-perception for red and green is nearly the same in the various degrees of his scale, so that in the majority of cases red- and green-blindness was probably simultaneously present. The examinations of Dohnberg, Kolbe, and Hermann

have been performed after the same plan, and therefore can be immediately compared. The percentages found by the Russian examiners are the following: Krohn, among 1,200 railway employés, 60 color-blind, or 5 %; Giluss found 20 color-blind, but unfortunately all other data are lacking; Skrebitzki, among 4,100, only 35, or 0.85 %; Höppner, among 3,100 employés, 36, or 1.16 %, and among 1,500 employés, 18. or 1.20 %; Wyrubow, among 861 employés, 42, or 4.79 %; Ljubinski, among 4,578 sailors, 278, or 6.08 %, and among 377 school-girls, only 2, or 0.53 %; Kolbe, among 1,235 women, 2, or 0.16 %, and among 2,931 male persons, 73, or 2.50 %; Dohnberg and Kolbe, among 360 midshipmen, 7, or 1.95 %; Hermann, among 1,001 pupils and students, 16, or 1.60 %. In the examination of the marine training-school, Kolbe and Dohnberg used the chromatoptometric chart of Bull, and Kolbe's color-saturating plate, with best result. In the second part of his paper, Kolbe discusses the methods of Holmgren and Stilling, which he considers equivalent and supplementing one another, and the simultaneous employment of which he therefore recommends. The quantitative determination of the color-sense is also discussed; but only Bull's chromatoptometric chart (the obligatory introduction of which he recommends) is more closely described, as well as Kolbe's color-saturating plate and Kolbe's chromatometer. (These instruments can be obtained from Schultze, instrument-maker to the university of Dorpat, and from Richter, instrument-maker, of St. Petersburg.) As to the formal side of the examination, Kolbe urgently recommends the introduction of an examining commission, consisting of specialists and superior railway officials, similar to those already established at the Bergisch-Märkische and the Main-Weser railways. The results ascertained should be entered in the books and on the service papers of every employé, and published annually—a proposition in which the reviewer heartily concurs.

According to LUBBOCK (14), if we admit the theory of evolution in general, **a development of the color-sense** must certainly have taken place. When and how this has happened is doubtful. He is unable to accept the explanations hitherto attempted, but can offer nothing better in their stead. Recent literature has been drawn upon but imperfectly.

(15) The **chart for the education of the color-sense** issued by MAGNUS has been published in an English edition by JEFFRIES. This Anglo-American chart is arranged exactly like its German prototype, only in each series of colors there is one additional tint; of each color there is a saturated tint, two lighter and two darker. A pamphlet by Jeffries is supplied with the chart. It will probably be introduced into the schools of Boston. A report to that effect is already before the Boston Board of Health (comp. No. 16).

PFLÜGER (18) recommends the excellently executed second edition of his COLOR-CHARTS with the following words: "This method of testing the color-sense has the advantage that two objective colors are not brought in comparison, but one objective and one subjective one; furthermore, that the examination may be performed by a layman equally well as by an expert, and, finally, that the examination can be made under such conditions that the examined will not be conscious that his color-sense is being tested. Besides, the charts are appropriate to the rapid detection of simulated unilateral amblyopia and amaurosis."

SOURRY (20) is altogether opposed to the view of Grant Allen that the **human and the animal color-sense are identical.** Sourry occupies the stand-point of Magnus, who has demonstrated such identity to be impossible; the capacity of the color-sense depends most intimately on the anatomico-optical condition of the visual organ. Corresponding to the structural peculiarities of the eye, the optical functions must likewise differ.

SOURRY (21) declares the most recent investigations of Preyer regarding the development of the infantile color-sense to be an excellent support for the theory of the gradual development of the color-sense.

NOTICE.—The continuation of the Report on the second quarter will be published, in connection with that of the third quarter, in our next number.

MISCELLANEOUS NOTES.

A CORRECTION.—By Henry S. Oppenheimer, M.D., New York. In an article in these ARCHIVES for December, 1881, on "Extraction of Chips of Iron or Steel from the Interior of the Eye," Prof. J. Hirschberg quotes a case reported by me in the *Medical Record*, N. Y., of Nov. 13, 1880, as follows:

. . . "dilated (under narcosis) the wound, introduced the magnet thrice in vain, but finally found the foreign body within the wound. Two months after extraction S. $= \frac{10}{200}$," . . .

My report states that the foreign body entered the sclera, near the corneal margin, *down and inward*, and that an incision was made through the sclera, with a lance-knife, *as far back as practicable, on a level with the lower border of the rectus externus*. It explains that "the lips of the wound had not been held apart, and so the foreign body (about a grain in weight) had been stripped from the magnet on its exit from the wound. Two months later $V = \frac{20}{c}$."

No dilatation of any wound was mentioned. *Gruening's permanent magnet was used.*

Since the report mentioned, the patient's vision has improved greatly. The last test I made showed $V = \frac{20}{40}+$. Field normal, with some limitation, however, corresponding to a detachment of the retina downward and outward.

I think it important to have this case reported correctly. In spite of the brilliant achievements with the magnet in this field, the following question is by no means settled: Is it advisable, or even justifiable, to introduce instruments into the vitreous chamber for the extraction of foreign bodies, the location of which cannot be accurately determined? So far this is the only case I know of which would justify an affirmative answer.

The N. Y. POLICLINIC, a (post-graduate) school of practical medicine and surgery, 214 and 216 East 34th Street, was opened Nov. 7, 1882. The course of teaching is divided into five sessions of six weeks each. Thirty-six clinical lessons—no didactic lectures—will be given on each subject during each session. E. GRÜNING and D. WEBSTER are the professors of ophthalmology; L. ELSBERG and R. C. BRANDEIS the professors of laryngology, rhinology, and otology. Dr. Jas. R. Leaming, prof. diseases of the chest, is the president of the faculty.

LOUIS AUGUSTE DESMARRES, died in Paris, August, 1882. He had a hard struggle for existence in his youth. At the age of 24 years he began his medical studies. Four years later, in 1838, he became assistant to the ophthalmic clinic of Sichel. A year later he graduated, and while practising general medicine, remained Sichel's assistant until 1844, when he opened a clinic of his own, devoting himself entirely to ophthalmology. Three years later the first edition of his celebrated text-book appeared, and soon gave him a world-wide, well-deserved reputation. The second edition of this work appeared in three volumes, from 1854 to 1858. It is one of the fundamental treatises of our specialty, excellently well written, and full of original observations in every department of practical, especially operative, ophthalmology. By this work, but perhaps still more by his clinical teaching and his example, he exerted a great influence on the development of eye surgery, in the history of which he inscribed his name on many a page. H. K.

ROBERT W. LYALL, M.D., F.R.C.S., an assistant surgeon to the Royal London Ophthalmic Hospital, died in London Oct. 2, 1882, at the early age of 33 years. Though young, he had done much that gave promise of a future of unusual activity and usefulness.

GEORGE CRITCHETT, F.R.C.S., the eminent English ophthalmologist, died in London, Nov. 1, 1882. He was born in 1817, and during the first part of his professional life was connected, in the capacity of general surgeon, with the London Hospital. He is known to the world chiefly, however, from his association with the Royal London Ophthalmic Hospital, where he began his work as a specialist early in his career. In 1876, having retired from this field in accordance with a regulation of the institution, he was called to the position of ophthalmic surgeon at the Middlesex Hospital, made vacant by the resignation of Mr. Hulke.

His published work has not been great, consisting of a series of lectures on ophthalmic surgery which appeared in the *Lancet*, and occasional contributions to the journals.

He originated the subconjunctival method of dividing the tendon in strabismus, and the method of advancement as now generally practised. He also devised the operations of iridodesis and of abscission of the ball.

As an operator he was skilful, careful, and conscientious, and his judgment was sound. Personally he was most kind and pleasant, and physicians and students who were privileged to follow the service at the great charity of Moorfields, always carried away with them a memory of the genial Critchett as the highest type of the English gentleman. S. M. B.

INDEX OF AUTHORS TO VOLUME XI.

ADAMÜK, E. Some Observations upon Tumors of the Eye . . 190

ANDREWS, J. A. Syphilitic Gumma of the Sclera 458

AYRES, S. C. Sympathetic Inflammation 199

AYRES, WILLIAM C. The Blood Circulation in the Region of the Yellow Spot 476

BETTMAN, BOERNE. The Condition of the Eyes in Two Cases of Fatal Anæmia—An Anatomical Investigation . . . 12

BOWEN, WILLIAM SHAW. Long-Continued Presence of a Spiculum of Copper in the Cornea Without Exciting Apparent Irritation 333

BURNETT, SWAN M. A Case of Coloboma of the Choroid at the Macula Lutea, Unaccompanied by Coloboma of the Iris . . 461

——— Four American Text-Books on Ophthalmology . . 74

CAPRON, F. P. A Case of Blindness after Fracture of the Base of the Skull 335

CHISOLM, JULIAN J. Rupture of the Eyeball in its Posterior Hemisphere from a Blow in the Face 44

——— Two Cases of Malignant Tumor of the Sphenoidal Cavities Implicating Vision . . . 52

——— Extensive Ravages from Lupus, with Subsequent Cicatrization, Leaving but One Small Hole in the Face which Represents both Mouth and Nose, and with Complete Closure of the Anterior Nasal Orifices 234

——— An Obscure Case in Nerve Pathology Accompanying Optic Neuritis 239

——— Congenital Paralysis of the Sixth and Seventh Pairs of Cranial Nerves in an Adult . 323

——— Cataract-Extraction with Iridectomy in an Infant Six Months Old 326

COHN, HERMANN. Eye-Diseases from Masturbation 428

CORNWELL, HENRY G. A Compound Dermoid Cyst of the Orbit 338

DERBY, H. Three Cases of Hydrophthalmus Treated with Iridectomy 37

FÖRSTER, R. On the Maturity of Cataract, its Artificial Ripening, Corelysis and Extraction of the Anterior Capsule . . . 344

HOBBY, C. M. A Case of Quinine Amaurosis Manifesting Itself Primarily in One Eye Only 34

HOLMES, E. L., and PARK, ROSWELL. A Case of Severe Injury of the Orbit 58

HOTZ, F. C. Serious Effect of Calomel upon the Eye . . . 49

——— Remarks on 177 Operations for Entropium and Trichiasis 442

KNAPP, H. On Croup of the Conjunctiva. With Remarks on the Treatment of the Contagious Forms of Conjunctival Inflammation 1

KNAPP, H. Foreign Bodies Tolerated in the Background of the Eye, with Preservation of Good Sight 222

——— A Fragment of Steel Embedded in the Cornea for Two Years Without Causing Irritation 232

——— Short Report on the 18th Annual Meeting of the American Ophthalmological Society, held at Lake George on July 26 and 27, 1882 403

KRAUSE, FEDOR. Contributions to the Pathology of Sympathetic Eye Disease 173

——— On the Anatomical Alterations after Optico-Ciliary Neurotomy 309

KUBLI, THEODORE. The Clinical Significance of the so-called myloidA Tumors of the Conjunctiva, with a Report of Three New Cases. 149

MAGNUS, H., HORSTMANN, C., and NIEDEN, A. Systematic Report on the Progress of Ophthalmology during the Third Quarter of the Year 1881 . . 79

——— During the Fourth Quarter of the Year 1881 243

——— During the First Quarter of the Year 1882 360

——— During the Second Quarter of the Year 1882 490

MOOREN. Disturbances of Vision and Uterine Disease 281

NIEDEN, A. A New Case of Pulsating Exophthalmus of Both Eyes 185

——— Report on the 14th Meeting of the Ophthalmological Society at Heidelberg, Sept. 14–16 482

NOYES, HENRY D. Two Cases of Hemi-Achromatopsia . . 210

OLIVER, CHARLES A. Preliminary Paper on the Determination of a Standard of Color-Sense for Reflected Color by Daylight; with a Graphic Description of the Individual Limits and Average Results of Sixteen Cases 65

RÄHLMANN, Prof. Amyloid Degeneration of the Eyelids . . 466

RÜTER, H. Tuberculosis of the Iris 407

SCHWEIGGER, C. Observations on Detachment of the Retina . 451

THOMPSON, J. L. Extraction of Foreign Bodies from the Iris . 41

WHITE, JOSEPH A. Tumor of Lachrymal Gland 62

WIETHE, THEODORE. A Case of Congenital Deformity of the Optic Disc 70

YOUNG, H. B. A Case of Congenital Irideremia 465

INDEX OF SUBJECTS TO VOLUME XI.

Amyloid Tumors, The Clinical Significance of the so-called, of the Conjunctiva, with a Report of Three New Cases. By Theodore Kubli 149

Amyloid Degeneration of the Eyelids. By Prof. Rählmann. (With plate vi, figs. 1–6.) 466

Anæmia, The Condition of the Eyes in Two Cases of Fatal. An Anatomical Investigation. By Dr. Boerne Bettman . . . 12

Blood Circulation in the Region of the Yellow Spot. By William C. Ayres 476

Calomel, Serious Effect of upon the Eye. By F. C. Hotz . . 49

Cataract-Extraction with Iridectomy in an Infant Six Months Old. By Julian J. Chisolm . 326

Coloboma, A Case of, of the Choroid at the Macula Lutea, Unaccompanied by Coloboma of the Iris. By Swan M. Burnett. (With a wood-cut.) 461

Color-Sense, Preliminary paper on the Determination of a Standard of, for Reflected Color by Daylight; with a Graphic Description of the Individual Limits and Average Results of

Sixteen Cases. By Charles A. Oliver 65

Copper, Long-Continued Presence of a Spiculum of, in the Cornea Without Exciting Apparent Irritation. By William Shaw Bowen 333

Cranial Nerves, Congenital Paralysis of the Sixth and Seventh Pairs of, in an Adult. By Julian J. Chisolm 323

Croup of the Conjunctiva. With Remarks on the Treatment of the Contagious Forms of Conjunctival Inflammation. By Dr. H. Knapp 1

Deformity, A Case of Congenital, of the Optic Disc. By Dr. Theodore Wiethe 70

Dermoid Cyst, A Compound, of the Orbit. By Henry G. Cornwell 338

Entropium, Remarks on 177 Operations for, and Trichiasis. By F. C. Hotz 442

Foreign Bodies, Extraction of, from the Iris. By J. L. Thompson 41

Foreign Bodies Tolerated in the Background of the Eye, with Preservation of Good Sight. By H. Knapp 222

Fracture of the Base of the Skull. A Case of Blindness after. By F. P. Capron 335

Hemi-Achromatopsia, Two Cases of. By Henry D. Noyes . . 210

Hydrophthalmus, Three Cases of. Treated with Iridectomy. By H. Derby 37

Injury of the Orbit, A Case of Severe. By E. L. Holmes and Roswell Park 58

Irideremia, A Case of Congenital. By H. B. Young 465

Lachrymal Gland, Tumor of. By Joseph A. White 62

Lupus, Extensive Ravages from, with Subsequent Cicatrization, Leaving but One Small Hole in the Face which Represents both Mouth and Nose, and with Complete Closure of the Anterior Nasal Orifices. By Julian J. Chisolm 234

Masturbation, Eye Diseases from. By Hermann Cohn 428

Maturity of Cataract, On the, its Artificial Ripening, Corelysis and Extraction of the Anterior Capsule. By R. Förster . . 344

Miscellaneous Notes 148

——— 279

——— 406

——— 516

Neurotomy, On the Anatomical Alterations after Optico-Ciliary. By Fedor Krause 309

Optic Neuritis, An Obscure Case in Nerve Pathology Accompanying. By Julian J. Chisolm 239

Pulsating Exophthalmus, A New Case of, of Both Eyes. By A. Nieden 185

Quinine Amaurosis, A Case of, Manifesting Itself Primarily in One Eye Only. By C. M. Hobby 34

Report, Systematic, on the Progress of Ophthalmology during the Third Quarter of the Year 1881. By H. Magnus, C. Horstmann, and A. Nieden . 79

——— During the Fourth Quarter of the Year 1881 . . . 243

——— During the First Quarter of the Year 1882 360

——— During the Second Quarter of the Year 1882 . . . 490

Report on the 14th Meeting of the Ophthalmological Society at Heidelberg, Sept. 14-16. By Dr. A. Nieden, Bochum . . 482

Report, Short, on the 18th Annual Meeting of the American Ophthalmological Society, held at Lake George on July 26 and 27, 1882. By H. Knapp . . 403

Retina, Observations on Detachment of the. By Prof. C. Schweigger, M.D., Berlin . . 451

Rupture of the Eyeball in its Posterior Hemisphere from a Blow in the Face. By Julian J. Chisolm 44

Steel, A Fragment of, Embedded in the Cornea for Two Years Without Causing Irritation. By H. Knapp 232

Sympathetic, Contributions to the Pathology of, Eye Disease. By Fedor Krause 173

Smypathetic Inflammation. By S. C. Ayres, M.D., Cincinnati 199

Syphilitic Gumma of the Sclera. By J. A. Andrews, ... 458

Text-Books, Four American, on Ophthalmology. Reviewed by Swan M. Burnett 74

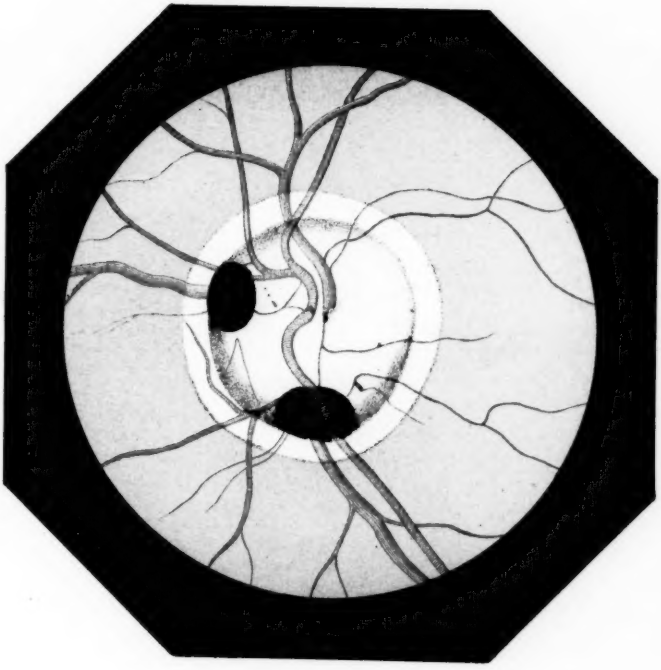
Tuberculosis of the Iris. By Dr. H. Rütter, of Berlin. . . . 407

Tumor, Two Cases of Malignant, of the Sphenoidal Cavities Implicating Vision. By Julian J. Chisolm 52

Tumors, Some Observations upon, of the eye. By E. Adamük . 190

Uterine Diseases, Disturbances of Vision and. By Mooren . . 281

Tab. I.



W. Th. Wrethe del. Verlag v. J. F. Bergmann, Wiesbaden. Lith. Anst. v. E. A. Funke, Leipzig.

Fig. 1.

Fig. 2.

Fig. 3.

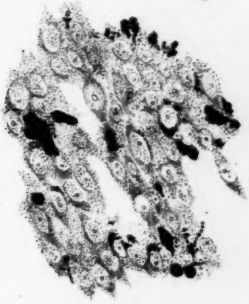


Fig. 4.

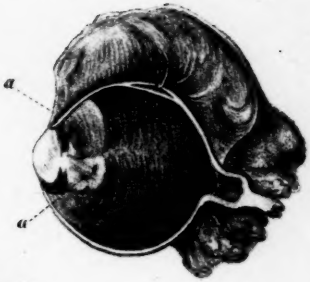


Fig. 5.

Lith. Anst. v. E. Wirtz, Darmstadt.

Verlag v. J. F. Bergmann, Wiesbaden.

Fig. 1.

Fig. 3.

Fig. 2.

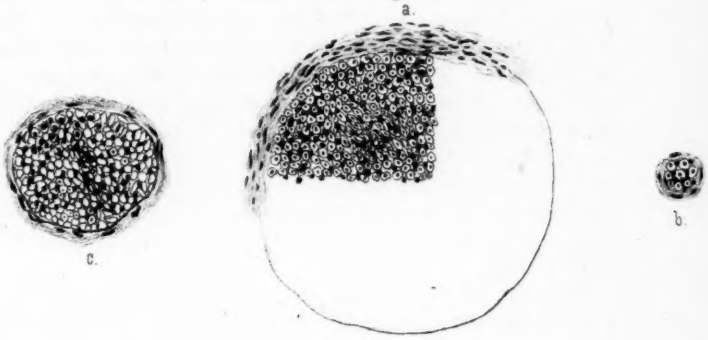


Fig. 4.

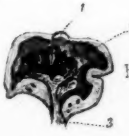


Fig. 5.

Fig. 6.

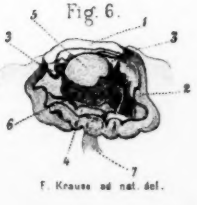
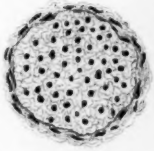


Fig. 7.



Lith. Anst. v. F. Wintz, Darmstadt. F. Krause ad nat. del. Verlag v. J. F. Bergmann, Wiesbaden.

Fig. 1.

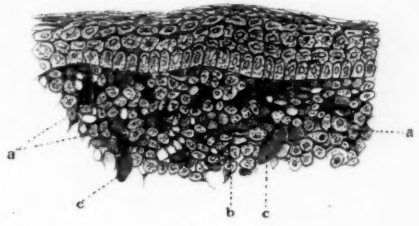


Fig. 3.

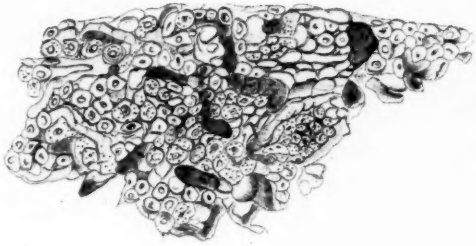


Fig. 2.

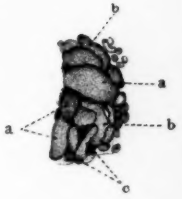
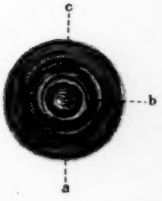


Fig. 4.

Fig. 5.

Fig. 6.



E. Raehlmann. del.

Lith. Anst. v. Werner & Winter, Frankfurt a/M.

Fig.2.

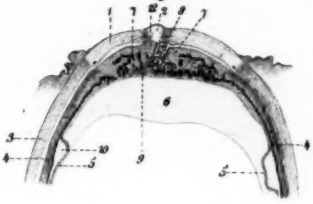


Fig.3.

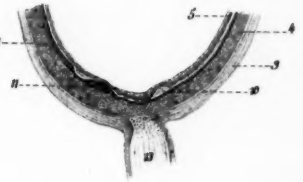


Fig.5.

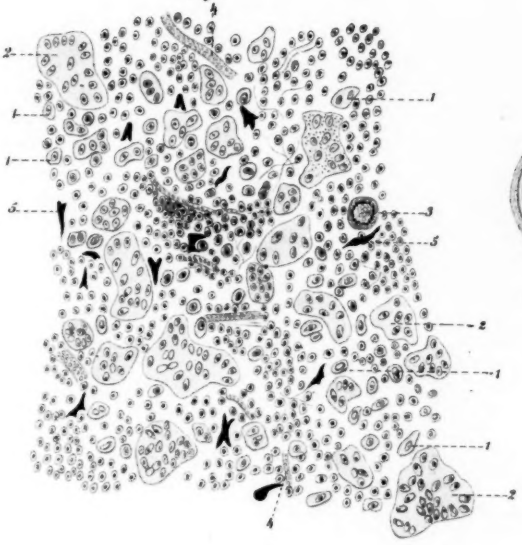


Fig.1.

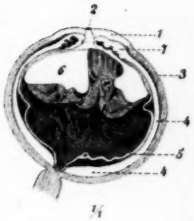


Fig.4a

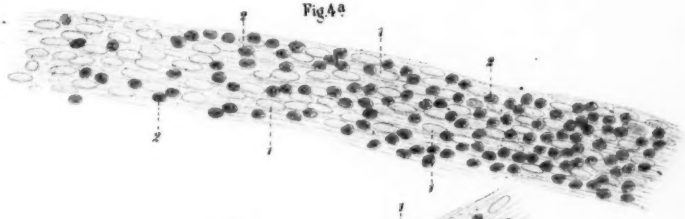
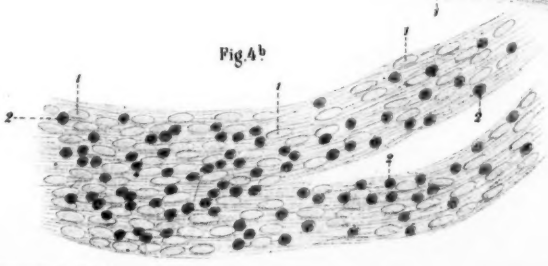


Fig.4b



Fr. Krauss u. Eyrich del. et lith. Verlag v. J. F. Bergmann, Wiesbaden. Lith. Anst. v. E. A. Funke, Leipzig.